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Technical Publication 000051



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TIDAL AND LUNAR DATA FOR
POINT MUGU, SAN NICOLAS ISLAND,
AND THE BARKING SANDS AREA
DURING 1990

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DEC 6 5 1989
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Compiled by
RICH DIXON
Geophysics Division

31 December 1989



Approved For Public Release; Distribution Is Unlimited

PACIFIC MISSILE TEST CENTER

Point Mugu, California 93042

001

PACIFIC MISSILE TEST CENTER

AN ACTIVITY OF THE NAVAL AIR SYSTEMS COMMAND

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and CAPT M. MERICKEL, Director Range Directorate (Acting), have
approved this report for publication.**

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Executive Director**

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INTRODUCTION

This publication combines into a single source all tidal and lunar data for operational locations of the Pacific Missile Test Center for use in Calendar Year 1990.

The data presentations are in two main divisions: one for Point Mugu and San Nicolas Island, and the other for the Barking Sands area. Within each division, the times of moonrise and moonset and tidal data are given. Appendixes provide information on lunar phases, sunrise and sunset times and calculation of the tide at any time. This publication is issued annually. Information regarding this data may be obtained from the Geophysics Division of the Range Operations Department.

DATA SOURCE AND TIME REFERENCES

The data given here have been prepared from information contained in Tide Tables for the West Coast of North and South America including the Hawaiian Islands, 1990, published by the National Ocean Service.

For Point Mugu and San Nicolas Island, all times listed are Pacific Standard Time (PST); add eight hours to obtain Universal Coordinated Time (UCT or Z). When Daylight Savings Time (PDT) is in effect, 1 hour is to be added to the times given. In 1990, Pacific Daylight Time is scheduled to commence at 0200 PST on Sunday 1 April, and to end at 0200 PDT on Sunday 28 October.

For the Barking Sands Area, all times listed are Alaska-Hawaii Standard Time (AHST); add ten hours to obtain UCT. Daylight Savings Time is not observed in Hawaii.

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TIDAL DATA

The ranges of tidal heights that may be expected at Point Mugu and San Nicolas Island are shown in table 1. The range of heights for the primary harbor in the Barking Sands area, Port Allen, is shown in table 2. The times and height of high and low tides for 1990 at Point Mugu are given in the even-numbered tables 4 through 26, and at San Nicolas Island in the odd-numbered tables 5 through 27. Similar tide data for Port Allen are given in tables 29 through 40.

Table 1. Tidal ranges for Point Mugu and San Nicolas Island

Tidal Levels	Point Mugu	San Nicolas Is.
	Height (Ft)	Height (Ft)
Extreme high water	7.3	6.7
Mean higher high water	5.3	4.9
Mean high water	4.5	4.1
Mean tide level (mean sea level)	2.7	2.5
Mean low water	0.9	0.8
Mean lower low water	0.0	0.0
Extreme low water	-2.0	-1.8

Table 2. Tidal Ranges for Port Allen

Tidal Levels	Height (Ft)
Extreme high water	2.6
Mean higher high water	1.6
Mean high water	1.2
Mean tide level (mean sea level)	0.7
Mean low water	0.2
Mean lower low water	0.0
Extreme low water	-0.4

These tables list the times and heights of high and low tide for each month of the year and chronologically through each day. The heights are all measured from mean lower low water and are values for a sea unaffected by wind waves or swell. The height and character of the sea surface are influenced by factors other than the predictable positions of the moon and sun, and thus are likely to be higher or lower than computed values indicate.

LUNAR DATA

Times of moonrise and moonset for the Point Mugu-San Nicolas Island area in 1990 are given in table 3, and for the Barking Sands area in table 28, preceding the tidal data for the respective stations. Information regarding the phases of the moon in 1990 is found in appendix B.

Latitude	34 07 N
Longitude	119 07 W

Nautical Almanac Office
U.S. Naval Observatory
Washington, D.C. 20392-5100

Pacific Standard Time

Day	Jan.			Feb.			Mar.			Apr.			May			June			July			Aug.			Sept.			Oct.			Nov.			Dec.		
	Rise	Set	h m	Rise	Set	h m	Rise	Set	h m	Rise	Set	h m	Rise	Set	h m	Rise	Set	h m	Rise	Set	h m	Rise	Set	h m	Rise	Set	h m	Rise	Set	h m	Rise	Set	h m			
1	1032	2152	1007	0845	2315	1011	0027	1122	0044	1314	0043	1357	0004	1536	0025	1628	0155	1601	0247	1603	0452	1609	0606													
2	1032	2257	1044	0014	0927	1118	0122	1225	0119	1411	0109	1455	0034	1627	0114	1702	0258	1630	0352	1644	0605	1712	0719													
3	1101																																			
4	1131	0003	1221	0235	1115	0134	1329	0245	1423	0215	1605	0202	1650	0146	1755	0307	1803	0506	1733	0606	1830	0835	1936	0921												
5	1205	0112	1321	0340	1218	0233	1431	0317	1520	0240	1703	0233	1744	0231	1831	0409	1832	0610	1810	0717	1935	0943	2048	1008												
6	1245	0223	1427	0438	1325	0324	1530	0345	1616	0305	1800	0309	1833	0322	1903	0513	1903	0717	1854	0830	2044	1043	2156	1046												
7	1333	0335	1535	0527	1431	0407	1628	0411	1713	0331	1856	0349	1917	0418	1933	0616	1936	0825	1944	0944	2155	1132	2300	1119												
8	1430	0446	1643	0608	1536	0443	1725	0436	1811	0400	1949	0436	1956	0519	2002	0719	2014	0935	2043	1054	2302	1213		1148												
9	1534	0551	1747	0643	1638	0514	1822	0501	1909	0432	2036	0529	2031	0620	2031	0823	2058	1046	2148	1157		1248	0001	1215												
10	1644	0647	1849	0712	1737	0541	1920	0528	2006	0509	2118	0626	2101	0723	2101	0928	2150	1157	2256	1250	0007	1318	0100	1242												
11	1753	0734	1949	0739	1835	0607	2018	0558	2101	0551	2155	0726	2130	0825	2135	1035	2249	1303	1335	0108	1345	0159	1310													
12	1901	0812	2047	0805	1933	0632	2116	0631	2152	0639	2228	0827	2158	0927	2213	1145	2355	1402	0004	1413	0208	1412	0257	1340												
13	2004	0845	2144	0830	2030	0658	2213	0709	2238	0733	2258	0929	2227	1031	2259	1255		1453	0110	1445	0306	1439	0355	1414												
14	2105	0913	2241	0856	2128	0726	2307	0753	2318	0831	2326	1031	2258	1136	2354	1405	0103	1536	0213	1515	0404	1508	0452	1452												
15	2203	0939	2339	0925	2227	0756	2356	0843	2354	0932	2355	1134	2333	1243		1510	0211	1612	0314	1542	0502	1539	0549	1536												
16	2300	1004		0957	2325	0831		0939		1034		1238		1354	0056	1607	0317	1643	0413	1608	0601	1614	0642	1625												
17	2356	1029	0038	1033		0911	0041	1039	0026	1136	0025	1345	0014	1506	0204	1656	0421	1712	0512	1636	0658	1654	0731	1718												
18		1056	0136	1116	0021	0957	0120	1141	0056	1240	0058	1456	0104	1616	0314	1737	0522	1739	0611	1705	0754	1739	0815	1815												
19	0053	1125	0232	1206	0114	1050	0155	1245	0125	1345	0136	1610	0203	1721	0424	1812	0622	1806	0709	1738	0846	1829	0854	1914												
20	0152	1159	0324	1303	0203	1149	0227	1350	0155	1452	0222	1724	0310	1816	0530	1843	0721	1834	0808	1814	0934	1924	0928	2013												
21	0250	1239	0412	1405	0246	1251	0257	1456	0227	1604	0317	1834	0422	1903	0634	1911	0821	1904	0906	1856	1016	2021	0959	2112												
22	0348	1325	0453	1510	0325	1357	0327	1604	0303	1719	0422	1936	0533	1942	0735	1938	0920	1938	1001	1942	1053	2120	1027	2211												
23	0444	1419	0530	1617	0359	1503	0359	1716	0346	1835	0533	2028	0642	2015	0835	2005	1018	2016	1051	2034	1126	2219	1055	2311												
24	0535	1519	0604	1725	0431	1610	0433	1830	0437	1949	0645	2111	0748	2044	0934	2034	1115	2059	1137	2130	1156	2319	1122													
25	0620	1623	0635	1833	0501	1719	0513	1947	0538	2056	0756	2146	0850	2111	1033	2105	1209	2148	1218	2229	1225		1152	0013												
26	0659	1730	0705	1941	0532	1830	0600	2103	0646	2153	0902	2217	0950	2138	1132	2140	1258	2242	1254	2329	1253	0020	1225	0118												
27	0734	1836	0735	2051	0605	1943	0655	2213	0757	2239	1005	2244	1049	2205	1230	2220	1343	2341	1327				1304	0227												
28	0806	1943	0808	2203	0641	2057	0758	2313	0907	2317	1105	2311	1147	2234	1326	2306	1423		1357	0030	1355	0228	1351	0339												
29	0835	2049			0723	2212	0906		1014	2349	1203	2337	1245	2306	1418	2357	1458	0041	1427	0132	1432	0338	1448	0452												
30	0904	2156			0812	2323	1015	0003	1117		1300		1343	2343	1507		1530	0144	1456	0236	1516	0451	1554	0601												
31	0934	2304			0908				1216	0017			1441		1550	0054			1528	0342				1707	0703											

POINT MUGU TIDES
JANUARY 1990

34 DEG 07 MIN N. 119 DEG 07 MIN W - OCEAN PIER

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0027	3.9	0529	2.3	1111	4.9	1823	0.0
2	0104	4.1	0640	2.2	1206	4.2	1904	.5
3	0151	4.4	0813	1.9	1325	3.3	1946	1.1
4	0242	4.8	0950	1.4	1514	3.0	2041	1.5
5	0338	5.2	1117	.7	1712	2.9	2147	2.0
6	0434	5.6	1218	-1	1840	3.1	2256	2.2
7	0529	6.0	1311	-8	1942	3.4	0002	2.2*
8	0621	6.3	1359	-1.2	2030	3.6	0002	2.2*
9	0057	2.2	0710	6.5	1444	-1.5	2110	3.8
10	0150	2.0	0757	6.6	1523	-1.5	2148	3.9
11	0236	1.9	0839	6.5	1602	-1.4	2224	4.0
12	0321	1.8	0921	6.2	1638	-1.2	2302	4.1
13	0408	1.8	1003	5.8	1712	-7	2338	4.2
14	0457	1.8	1045	5.2	1744	-2	1815	.4
15	0013	4.2	0549	1.9	1124	4.4	1844	1.0
16	0051	4.2	0651	2.0	1210	3.7	1915	1.5
17	0133	4.3	0811	1.9	1312	3.0	2039	2.4
18	0219	4.3	0957	1.7	1508	2.5	2215	2.7
19	0315	4.4	1127	1.2	1801	2.5	2332	2.7
20	0415	4.6	1268	.8	1924	2.8	1815	.4
21	0508	4.8	1308	.3	2002	3.1	1915	1.5
22	0556	5.1	1343	-2	2024	3.3	2039	2.4
23	0025	2.6	0638	5.5	1414	-5	2215	2.7
24	0106	2.4	0713	5.8	1444	-8	2332	2.7
25	0145	2.1	0749	6.0	1511	-1.0	1815	.4
26	0223	1.9	0824	6.0	1540	-1.0	1915	1.5
27	0302	1.7	0902	6.0	1609	-1.0	2039	2.4
28	0343	1.5	0941	5.8	1641	-7	2215	2.7
29	0432	1.3	1020	5.3	1710	-3	2332	2.7
30	0523	1.3	1109	4.6	1742	.3	1815	.4
31	0005	4.8	0629	1.2	1205	3.8	1915	1.5

* --- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

SNI - BARGE BEACH TIDES

JANUARY 1990

33 DEG 13 MIN N. 119 DEG 27 MIN W - SOUTHEAST BEACH

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0040	3.6	0526	2.1	1124	4.5	1820	0.0
2	0117	3.8	0637	2.0	1219	3.9	1901	.4
3	0204	4.0	0810	1.8	1338	3.2	1943	1.0
4	0255	4.4	0947	1.3	1527	2.7	2038	1.4
5	0351	4.8	1114	.6	1725	2.6	2144	1.8
6	0447	5.1	1215	-1	1853	2.8	2253	2.0
7	0542	5.5	1308	-7	1955	3.1	2359	2.0
8	0634	5.8	1356	-1.1	2043	3.3	---	---
9	0054	2.0	0723	6.0	1441	-1.4	2123	3.5
10	0147	1.8	0810	6.1	1520	-1.4	2201	3.6
11	0233	1.8	0852	6.0	1559	-1.3	2237	3.7
12	0318	1.7	0934	5.7	1635	-1.1	2315	3.8
13	0405	1.7	1016	5.3	1709	-6	2351	3.9
14	0454	1.7	1058	4.8	1741	-2	---	---
15	0026	3.9	0546	1.8	1137	4.0	1812	.4
16	0104	3.9	0648	1.8	1223	3.4	1841	.9
17	0146	4.0	0808	1.8	1325	2.7	1912	1.4
18	0232	4.0	0954	1.6	1521	2.3	1941	1.8
19	0328	4.0	1124	1.1	1814	2.3	2036	2.2
20	0428	4.2	1223	.7	1937	2.6	2212	2.5
21	0521	4.4	1305	.3	2015	2.8	2329	2.5
22	0609	4.7	1340	-2	2037	3.0	---	---
23	0022	2.4	0651	5.0	1411	-4	2059	3.2
24	0103	2.2	0726	5.3	1441	-7	2121	3.3
25	0142	1.9	0802	5.5	1508	-9	2146	3.4
26	0220	1.8	0837	5.5	1537	-9	2211	3.6
27	0259	1.6	0915	5.5	1606	-9	2240	3.8
28	0340	1.4	0954	5.3	1638	-6	2310	4.0
29	0429	1.2	1033	4.8	1707	-3	2342	4.2
30	0520	1.2	1122	4.2	1739	.3	---	---
31	0018	4.4	0626	1.1	1218	3.5	1811	.8

* --- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

POINT MUGU TIDES
FEBRUARY 1990

34 DEG 07 MIN N. 119 DEG 07 MIN W - OCEAN PIER

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0051	4.9	0749	1.2	1322	3.1	1853	1.5
2	0146	5.0	0932	.9	1536	2.6	1938	2.1
3	0256	5.1	1108	.3	1801	2.8	2111	2.5
4	0413	5.3	1217	.3	1909	3.2	2258	2.6
5	0522	5.7	1310	.8	1951	3.5	---	---
6	0613	2.3	0621	6.0	1352	-1.2	2023	3.7
7	0107	2.0	0710	6.1	1430	-1.2	2051	4.0
8	0153	1.6	0752	6.1	1503	-1.2	2120	4.2
9	0236	1.4	0834	6.0	1535	-1.1	2148	4.4
10	0314	1.2	0910	5.8	1603	-.7	2216	4.5
11	0356	1.2	0948	5.3	1628	-.3	2242	4.5
12	0435	1.2	1020	4.7	1654	.2	2310	4.5
13	0517	1.2	1059	4.1	1715	.8	2338	4.5
14	0606	1.2	1138	3.5	1734	1.2	---	---
15	0606	4.4	0704	1.4	1231	2.8	1747	1.7
16	0043	4.3	0838	1.4	1424	2.3	1741	2.2
17	0136	4.2	1039	1.2	---	---	---	---
18	0303	4.2	1157	.8	---	---	---	---
19	0427	4.4	1242	.3	1951	3.1	2319	2.8
20	0530	4.8	1315	-.1	1956	3.4	---	---
21	0017	2.5	0617	5.2	1343	-.5	2010	3.6
22	0058	2.1	0654	5.5	1412	-.7	2029	3.8
23	0135	1.6	0736	5.8	1437	-.9	2051	4.2
24	0214	1.2	0812	5.8	1506	-.8	2112	4.5
25	0255	.8	0850	5.7	1534	-.6	2140	4.8
26	0337	.5	0933	5.4	1559	-.3	2209	5.1
27	0423	.3	1018	4.8	1631	.2	2243	5.3
28	0515	.2	1110	4.1	1703	.8	2320	5.3

* --- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

SNI - BARGE BEACH TIDES

FEBRUARY 1990

33 DEG 13 MIN N. 119 DEG 27 MIN W - SOUTHEAST BEACH

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0104	4.5	0746	1.1	1335	2.8	1850	1.4
2	0159	4.6	0929	.8	1549	2.4	1935	1.9
3	0309	4.7	1105	.3	1814	2.6	2108	2.3
4	0426	4.8	1214	-.3	1922	2.9	2255	2.4
5	0535	5.2	1307	-.7	2004	3.2	---	---
6	0610	2.1	0634	5.5	1349	-1.1	2036	3.4
7	0104	1.8	0723	5.6	1427	-1.1	2104	3.7
8	0150	1.5	0805	5.6	1500	-1.1	2133	3.9
9	0233	1.3	0847	5.5	1532	-1.0	2201	4.0
10	0311	1.1	0923	5.3	1600	-.6	2229	4.1
11	0353	1.1	1001	4.8	1625	-.3	2255	4.1
12	0432	1.1	1033	4.3	1651	-.2	2323	4.1
13	0514	1.1	1112	3.8	1712	.7	2351	4.1
14	0602	1.1	1151	3.2	1731	1.1	---	---
15	0019	4.0	0701	1.3	1244	2.6	1744	1.6
16	0056	4.0	0835	1.3	1437	2.1	1738	2.0
17	0149	3.9	1036	1.1	---	---	---	---
18	0316	3.9	1154	.7	---	---	---	---
19	0440	4.0	1239	.3	2004	2.8	2316	2.6
20	0543	4.4	1312	-.1	2009	3.1	---	---
21	0014	2.3	0630	4.8	1340	-.4	2023	3.3
22	0055	1.9	0707	5.0	1409	-.6	2042	3.5
23	0132	1.5	0749	5.3	1434	-.8	2104	3.9
24	0211	1.1	0825	5.3	1503	-.7	2125	4.1
25	0252	.7	0903	5.2	1531	-.5	2153	4.4
26	0334	.4	0946	4.9	1556	-.3	2222	4.7
27	0420	.3	1031	4.4	1628	.2	2256	4.8
28	0512	.2	1123	3.8	1700	.7	2333	4.8

* --- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

POINT MUGU TIDES
MARCH 1990

34 DEG 07 MIN N, 119 DEG 07 MIN W - OCEAN PIER

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0617	3	1213	3.4	1735	1.4	1810	2.0
2	0006	5.2	0736	4	1346	2.8	1914	2.5
3	0106	5.0	0916	3	1628	2.7	2136	2.8
4	0226	4.9	1052	0.0	1815	3.1	2322	2.5
5	0401	4.9	1201	4	1855	3.5	2322	2.5
6	0518	5.2	1249	7	1925	3.7	2322	2.5
7	0025	2.0	0617	5.4	1331	8	1954	4.1
8	0113	1.5	0705	5.5	1403	8	2019	4.3
9	0154	1.2	0747	5.5	1432	7	2042	4.6
10	0229	8	0823	5.3	1500	4	2105	4.7
11	0305	6	0857	5.0	1522	0.0	2127	4.8
12	0340	4	0932	4.6	1544	4	2149	4.9
13	0412	4	1006	4.2	1604	8	2211	4.9
14	0451	5	1043	3.6	1623	1.2	2233	4.8
15	0530	6	1124	3.2	1638	1.6	2300	4.6
16	0622	8	1221	2.7	1644	2.0	2333	4.4
17	0735	1.1	0928	1.0	1700	1.0	2333	4.4
18	0016	4.2	1101	7	1700	1.0	2333	4.4
19	0142	4.0	1151	4	1905	3.3	2307	2.7
20	0335	4.0	1226	0.0	1908	3.6	0001	2.2*
21	0452	4.3	1258	3	1921	3.8	0001	2.2*
22	0543	4.7	0130	5.0	1921	3.8	0001	2.2*
23	0642	1.6	0715	5.2	1352	4	1939	4.3
24	0121	1.1	0800	5.2	1424	3	2001	4.7
25	0203	4	0845	5.1	1453	0.0	2026	5.2
26	0245	2	0930	4.7	1524	4	2055	5.6
27	0329	6	1020	4.2	1556	9	2127	5.8
28	0417	8	1120	3.6	1631	1.4	2206	5.9
29	0510	8	1233	3.2	1710	1.9	2245	5.7
30	0611	6	1420	2.9	1758	2.4	2334	5.4
31	0728	3						

* --- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

SNI - BARGE BEACH TIDES

MARCH 1990

33 DEG 13 MIN N, 119 DEG 27 MIN W - SOUTHEAST BEACH

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0614	3	1226	3.1	1732	1.3	1807	1.8
2	0019	4.8	0733	4	1359	2.6	1911	2.3
3	0119	4.6	0913	3	1641	2.5	2133	2.6
4	0239	4.5	1049	0.0	1828	2.8	2319	2.3
5	0414	4.5	1158	4	1908	3.2	2319	2.3
6	0531	4.8	1246	6	1938	3.4	2319	2.3
7	0022	1.8	0630	4.9	1328	7	2007	3.8
8	0110	1.4	0718	5.0	1400	7	2032	4.0
9	0151	1.1	0800	5.0	1429	6	2055	4.2
10	0226	5	0836	4.8	1457	4	2118	4.3
11	0302	5	0910	4.6	1519	0.0	2140	4.4
12	0337	4	0945	4.2	1541	4	2202	4.5
13	0409	4	1019	3.9	1601	7	2224	4.5
14	0448	4	1056	3.3	1620	1.1	2246	4.4
15	0527	5	1137	2.9	1635	1.5	2313	4.2
16	0619	7	1234	2.5	1641	1.8	2346	4.0
17	0732	1.0	0925	9	1700	1.0	2346	4.0
18	0029	3.9	1058	6	1918	3.0	2304	2.5
19	0155	3.7	1148	4	1921	3.3	2358	2.0
20	0348	3.7	1223	0.0	1934	3.5	2358	2.0
21	0505	4.0	1255	3	1934	3.5	2358	2.0
22	0556	4.3	0643	4.6	1934	3.5	2358	2.0
23	0039	1.5	0728	4.8	1934	3.5	2358	2.0
24	0118	1.0	0813	4.8	1934	3.5	2358	2.0
25	0200	4	0858	4.7	1934	3.5	2358	2.0
26	0242	2	0943	4.3	1934	3.5	2358	2.0
27	0326	5	1033	3.9	1934	3.5	2358	2.0
28	0414	7	1133	3.3	1934	3.5	2358	2.0
29	0507	7	1246	2.9	1934	3.5	2358	2.0
30	0608	5	1433	2.6	1934	3.5	2358	2.0
31	0725	3			1934	3.5	2358	2.0

* --- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

34 DEG 07 MIN N, 119 DEG 07 MIN W - OCEAN PIER

DATE	TIME		HGT		TIME		HGT		TIME		HGT	
	PST	FT	PST	FT	PST	FT	PST	FT	PST	FT	PST	FT
1	0040	5.0	0854	-2	1630	3.0	1941	2.8	2205	2.6	2327	2.1
2	0209	4.6	1021	-2	1741	3.4	2205	2.6	2327	2.1	2337	1.9
3	0346	4.5	1124	-3	1814	3.7	1814	3.7	2327	2.1	2337	1.9
4	0508	4.8	1217	-4	1846	4.1	1846	4.1	2327	2.1	2337	1.9
5	0025	1.5	0604	4.7	1254	-3	1914	4.4	2205	2.6	2327	2.1
6	0108	1.1	0654	4.7	1326	-1	1939	4.7	2205	2.6	2327	2.1
7	0146	.6	0735	4.6	1352	.2	1958	4.9	2205	2.6	2327	2.1
8	0219	.3	0813	4.4	1415	.5	2020	5.1	2205	2.6	2327	2.1
9	0253	0.0	0849	4.2	1438	.8	2039	5.2	2205	2.6	2327	2.1
10	0325	-1	0924	3.9	1500	1.2	2103	5.2	2205	2.6	2327	2.1
11	0357	-2	1001	3.6	1519	1.4	2122	5.2	2205	2.6	2327	2.1
12	0433	.1	1040	3.3	1540	1.7	2151	5.0	2205	2.6	2327	2.1
13	0514	.1	1128	3.0	1556	2.0	2216	4.8	2205	2.6	2327	2.1
14	0600	.3	1235	2.7	1603	2.3	2249	4.6	2205	2.6	2327	2.1
15	0659	.5	2334	4.3	---	---	---	---	2205	2.6	2327	2.1
16	0818	.6	---	---	---	---	---	---	2205	2.6	2327	2.1
17	0043	4.0	0938	.5	1754	3.2	2044	3.0	2205	2.6	2327	2.1
18	0226	3.9	1038	.4	1748	3.5	2239	2.6	2205	2.6	2327	2.1
19	0402	3.9	1120	.2	1802	3.8	2337	1.9	2205	2.6	2327	2.1
20	0509	4.1	1159	.2	1822	4.3	---	---	2205	2.6	2327	2.1
21	0022	1.2	0607	4.3	1231	.2	1846	4.8	2205	2.6	2327	2.1
22	0107	.4	0659	4.4	1305	.3	1912	5.4	2205	2.6	2327	2.1
23	0149	-.3	0748	4.4	1339	.5	1944	5.9	2205	2.6	2327	2.1
24	0235	-1.0	0840	4.3	1413	.9	2019	6.1	2205	2.6	2327	2.1
25	0320	-1.3	0934	4.1	1451	1.2	2056	6.3	2205	2.6	2327	2.1
26	0409	-1.4	1030	3.7	1527	1.5	2138	6.2	2205	2.6	2327	2.1
27	0504	-1.3	1134	3.5	1612	1.9	2225	6.0	2205	2.6	2327	2.1
28	0606	-1.2	1249	3.3	1704	2.3	2321	5.6	2205	2.6	2327	2.1
29	0712	-.8	1418	3.3	1814	2.6	---	---	2205	2.6	2327	2.1
30	0024	5.0	0826	-.5	1542	3.5	2006	2.7	2205	2.6	2327	2.1

33 DEG 13 MIN N, 119 DEG 27 MIN W - SOUTHEAST BEACH

DATE	TIME		HGT		TIME		HGT		TIME		HGT	
	PST	FT	PST	FT	PST	FT	PST	FT	PST	FT	PST	FT
1	0053	4.6	0851	-2	1643	2.7	1938	2.6				
2	0222	4.2	1018	-2	1754	3.1	2202	2.4				
3	0359	4.1	1121	-3	1827	3.4	2324	1.9				
4	0521	4.2	1214	-4	1859	3.8						
5	0022	1.4	0617	4.3	1251	-3	1927	4.0				
6	0105	1.0	0707	4.3	1323	-1	1952	4.3				
7	0143	.5	0748	4.2	1349	.2	2011	4.5				
8	0216	.3	0826	4.0	1412	.4	2033	4.7				
9	0250	0.0	0902	3.9	1435	.7	2052	4.8				
10	0322	-1	0937	3.6	1457	1.1	2116	4.8				
11	0354	-2	1014	3.3	1516	1.3	2135	4.8				
12	0430	.1	1053	3.0	1537	1.6	2204	4.6				
13	0511	.1	1141	2.7	1553	1.8	2229	4.4				
14	0557	.3	1248	2.5	1600	2.1	2302	4.2				
15	0656	.4	2347	4.0								
16	0815	.5										
17	0056	3.7	0935	.4	1807	2.9	2041	2.7				
18	0239	3.6	1035	.4	1801	3.2	2236	2.4				
19	0415	3.6	1117	.2	1815	3.5	2334	1.8				
20	0522	3.8	1156	-2	1835	4.0						
21	0019	1.1	0620	4.0	1228	.2	1859	4.4				
22	0104	-.4	0712	4.0	1302	.3	1925	4.9				
23	0146	-.3	0801	4.0	1336	.4	1957	5.4				
24	0232	-.9	0853	4.0	1410	.8	2032	5.6				
25	0317	-1.2	0947	3.8	1448	1.1	2109	5.9				
26	0406	-1.3	1043	3.4	1524	1.4	2131	5.7				
27	0501	-1.2	1147	3.2	1609	1.8	2233	5.5				
28	0603	-1.1	1302	3.0	1701	2.1	2334	5.1				
29	0709	-.7	1431	3.0	1811	2.4						
30	0037	4.6	0823	-.4	1555	3.2	2003	2.5				

ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT

POINT MUGU TIDES

MAY 1990

34 DEG 07 MIN N, 119 DEG 07 MIN W - OCEAN PIER

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0150	4.5	0936	-2	1642	3.8	2158	2.4
2	0323	4.1	1036	0.0	1724	4.1	2315	1.8
3	0439	3.9	1123	.2	1757	4.5	---	---
4	0012	1.2	0545	3.9	1205	.5	1828	4.8
5	0058	.8	0641	3.8	1237	.8	1852	5.0
6	0137	3	0727	3.7	1306	1.1	1915	5.2
7	0209	0.0	0808	3.6	1331	1.3	1939	5.3
8	0241	-3	0847	3.6	1356	1.5	2001	5.4
9	0316	-5	0928	3.4	1418	1.8	2026	5.5
10	0348	-5	1010	3.3	1443	2.0	2052	5.4
11	0424	-4	1051	3.1	1508	2.2	2124	5.3
12	0502	-3	1142	3.0	1533	2.4	2154	5.1
13	0547	-2	1243	2.9	1559	2.6	2230	4.9
14	0637	0.0	1406	2.9	1644	2.8	2315	4.6
15	0729	2	1515	3.1	1814	3.0	---	---
16	0015	4.2	0826	.3	1557	3.5	2022	2.9
17	0136	3.8	0918	.4	1629	3.7	2205	2.4
18	0309	3.6	1008	.6	1654	4.2	2311	1.6
19	0435	3.6	1052	.7	1724	4.8	0004	.8*
20	0545	3.6	1134	.9	1756	5.4	---	---
21	0052	-1	0649	3.7	1216	1.2	1826	5.9
22	0140	-8	0749	3.7	1258	1.3	1911	6.3
23	0229	-1.3	0844	3.7	1340	1.5	1952	6.6
24	0315	-1.7	0940	3.7	1422	1.7	2036	6.7
25	0407	-1.8	1035	3.6	1511	1.9	2122	6.5
26	0459	-1.6	1134	3.6	1604	2.2	2214	6.1
27	0552	-1.3	1240	3.6	1704	2.4	2307	5.7
28	0648	-1.0	1341	3.6	1821	2.5	---	---
29	0006	5.0	0744	-5	1444	3.8	1952	2.5
30	0119	4.3	0839	0.0	1540	4.1	2130	2.2
31	0241	3.7	0934	.5	1625	4.4	2251	1.7

* --- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

SNI - BARGE BEACH TIDES

MAY 1990

33 DEG 13 MIN N, 119 DEG 27 MIN W - SOUTHEAST BEACH

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0203	4.1	0933	-2	1655	3.5	2155	2.2
2	0336	3.8	1033	0.0	1737	3.8	2312	1.7
3	0452	3.6	1120	.2	1810	.1	---	---
4	0009	1.1	0558	3.6	1202	.4	1841	4.4
5	0055	.7	0654	3.5	1234	.7	1905	4.6
6	0134	.3	0740	3.4	1303	1.0	1928	4.8
7	0206	0.0	0821	3.3	1328	1.2	1952	4.8
8	0238	-3	0900	3.3	1353	1.4	2014	4.9
9	0313	-4	0941	3.1	1415	1.7	2039	5.0
10	0345	-4	1023	3.0	1440	1.8	2105	4.9
11	0421	-4	1104	2.8	1505	2.0	2137	4.8
12	0459	-3	1155	2.7	1530	2.2	2207	4.7
13	0544	-2	1256	2.6	1556	2.4	2243	4.5
14	0634	0.0	1419	2.6	1641	2.6	2328	4.2
15	0726	.2	1528	2.8	1811	2.7	---	---
16	0028	3.9	0823	.3	1610	3.2	2019	2.6
17	0149	3.5	0915	.4	1642	3.4	2202	2.2
18	0322	3.3	1005	.5	1707	3.9	2308	1.5
19	0448	3.3	1049	.6	1737	4.4	0001	.7*
20	0558	3.3	1131	.8	1809	4.9	---	---
21	0049	-1	0702	3.4	1213	1.1	1839	5.4
22	0137	-7	0802	3.4	1255	1.2	1924	5.8
23	0226	-1.2	0857	3.4	1337	1.4	2005	6.1
24	0317	-1.6	0953	3.4	1419	1.6	2049	6.2
25	0404	-1.7	1048	3.3	1508	1.8	2135	6.0
26	0456	-1.5	1147	3.3	1601	2.0	2227	5.6
27	0549	-1.2	1253	3.3	1701	2.2	2320	5.2
28	0645	-9	1354	3.3	1818	2.3	---	---
29	0019	4.6	0741	-4	1457	3.5	1949	2.3
30	0132	4.0	0836	0.0	1553	3.8	2127	2.0
31	0254	3.4	0911	.4	1638	4.0	2248	1.6

* --- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

9	0440	-6	1014	3.3	1322	4.3	2006	5.7	0910	3.0	1317	2.0	1918	5.0
10	0415	-6	1050	3.3	1420	2.4	2036	5.7	0949	3.0	1349	2.1	1947	5.1
11	0451	-6	1132	3.3	1456	2.4	2110	5.6	1027	3.0	1417	2.2	2049	5.2
12	0526	-5	1216	3.4	1534	2.5	2145	5.5	1103	3.0	1453	2.2	2123	5.1
13	0605	-3	1301	3.5	1617	2.6	2222	5.2	1145	3.0	1531	2.3	2158	5.0
14	0644	0.0	1342	3.6	1713	2.7	2303	4.8	1229	3.1	1614	2.4	2235	4.8
15	0724	-3	1424	3.9	1824	2.7	2355	4.3	1314	3.2	1710	2.5	2316	4.4
16	0104	3.8	0809	1.6	1955	2.5	---	---	1355	3.3	1821	2.5	0008	4.0*
17	0232	3.4	0858	1.0	1509	4.3	2126	2.0	1437	3.6	1952	2.3	---	---
18	0414	3.2	0949	1.3	1550	4.7	2247	1.3	0806	1.5	1522	4.0	2123	1.8
19	0543	3.2	1042	1.6	1632	5.3	2351	1.5	0855	1.2	1603	4.3	2244	1.2
20	0046	-3	0657	3.3	1716	5.8	---	---	0946	1.2	1645	4.8	2348	1.4
21	0135	-1.0	0758	3.5	1137	1.9	1804	6.2	1039	1.5	1729	5.3	---	---
22	0224	-1.4	0852	3.6	1229	2.0	1850	6.6	0710	3.0	1134	1.8	1817	5.7
23	0313	-1.7	0941	3.7	1322	2.0	1939	6.8	0811	3.2	1226	1.8	1903	6.1
24	0359	-1.7	1030	3.8	1414	2.0	2025	6.8	0905	3.3	1319	1.8	1952	6.2
25	0444	-1.5	1115	3.9	1507	2.0	2115	6.6	0954	3.4	1411	1.8	2038	6.2
26	0528	-1.2	1203	4.0	1601	2.1	2203	6.2	1043	3.5	1504	1.8	2128	6.1
27	0613	-7	1251	4.1	1657	2.1	2251	5.7	1128	3.6	1558	1.9	2216	5.7
28	0656	-1	1338	4.3	1803	2.2	2343	5.0	1216	3.7	1654	1.9	2304	5.2
29	0042	4.2	0736	1.5	1918	2.2	---	---	1304	3.8	1800	2.0	2356	4.6
30	0151	3.5	0818	1.1	1427	4.4	2044	2.1	1351	4.0	1915	2.0	---	---
	0328	3.0	0907	1.6	1515	4.6	2216	1.7	0733	1.4	1440	4.0	2041	1.9
					1601	4.8	2332	1.2	0815	1.0	1528	4.2	2213	1.6
									0904	1.5	1614	4.4	2329	1.1

* --- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

* --- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

POINT MUGU TIDES
JUNE 1990

34 DEG 07 MIN N, 119 DEG 07 MIN W - OCEAN PIER

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0405	3.4	1020	9	1704	4.7	2354	1.2	0418	3.1
2	0526	3.3	1106	1.2	1736	5.0	1807	5.2	0539	3.0
3	0044	7	0632	3.2	1141	1.6	1836	5.4	0645	2.9
4	0126	2	0727	3.2	1217	1.8	1905	5.5	0740	2.9
5	0201	1	0813	3.3	1248	2.0	2006	5.7	0826	3.0
6	0233	4	0857	3.3	1320	2.2	2036	5.7	0910	3.0
7	0305	5	0936	3.3	1352	2.3	2066	5.7	0949	3.0
8	0340	6	1014	3.3	1420	2.4	2096	5.7	1027	3.0
9	0415	6	1050	3.3	1456	2.4	2126	5.7	1103	3.0
10	0451	6	1132	3.3	1534	2.5	2156	5.5	1145	3.0
11	0526	5	1216	3.4	1617	2.6	2222	5.2	1229	3.1
12	0605	3	1301	3.5	1713	2.7	2303	4.8	1314	3.2
13	0644	0.0	1342	3.6	1824	2.7	2355	4.3	1355	3.3
14	0724	3	1424	3.9	1955	2.5	---	---	1437	3.6
15	0104	3.8	0809	6	1509	4.3	2126	2.0	1522	4.0
16	0232	3.4	0858	1.0	1550	4.7	2247	1.3	1603	4.3
17	0414	3.2	0949	1.3	1632	5.3	2351	5	1645	4.8
18	0543	3.2	1042	1.6	1716	5.8	---	---	1729	5.3
19	0046	3	0657	3.3	1137	1.9	1804	6.2	1817	5.7
20	0135	1.0	0758	3.5	1229	2.0	1850	6.6	1903	6.1
21	0224	1.4	0852	3.6	1322	2.0	1939	6.8	1952	6.2
22	0313	1.7	0941	3.7	1414	2.0	2025	6.8	2038	6.2
23	0359	1.7	1030	3.8	1507	2.0	2115	6.6	2128	6.1
24	0444	1.5	1115	3.9	1601	2.1	2203	6.2	2216	5.7
25	0528	1.2	1203	4.0	1657	2.1	2251	5.7	2304	5.2
26	0613	7	1251	4.1	1803	2.2	2343	5.0	2356	4.6
27	0656	1	1338	4.3	1918	2.2	---	---	---	---
28	0042	4.2	0736	5	1427	4.4	2044	2.1	1915	2.0
29	0151	3.5	0818	1.1	1515	4.6	2216	1.7	2041	1.9
30	0328	3.0	0907	1.6	1601	4.8	2332	1.2	2213	1.6

* --- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

SNI - BARGE BEACH TIDES

JUNE 1990

33 DEG 13 MIN N, 119 DEG 27 MIN W - SOUTHEAST BEACH

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0418	3.1	1017	8	1717	4.3	2351	1.1	---	---
2	0539	3.0	1103	1.1	1749	4.6	1820	4.8	---	---
3	0041	6	0645	2.9	1138	1.5	1849	4.9	---	---
4	0123	2	0740	2.9	1214	1.7	1918	5.0	---	---
5	0158	1	0826	3.0	1245	1.8	1947	5.1	---	---
6	0230	4	0910	3.0	1317	2.0	2019	5.2	---	---
7	0302	4	0949	3.0	1349	2.1	2049	5.2	---	---
8	0337	5	1027	3.0	1417	2.2	2123	5.1	---	---
9	0412	5	1103	3.0	1453	2.2	2158	5.0	---	---
10	0448	5	1145	3.0	1531	2.3	2235	4.8	---	---
11	0523	4	1229	3.1	1614	2.4	2316	4.4	---	---
12	0602	3	1314	3.2	1710	2.5	---	---	---	---
13	0641	0.0	1355	3.3	1821	2.5	0008	4.0*	---	---
14	0721	3	1437	3.6	1952	2.3	---	---	---	---
15	0117	3.5	0806	5	1522	4.0	2123	1.8	---	---
16	0245	3.1	0855	9	1603	4.3	2244	1.2	---	---
17	0427	2.9	0946	1.2	1645	4.8	2348	4	---	---
18	0556	2.9	1039	1.5	1729	5.3	---	---	---	---
19	0043	3	0710	3.0	1817	5.7	1817	5.7	---	---
20	0132	9	0811	3.2	1903	6.1	1903	6.1	---	---
21	0221	1.3	0905	3.3	2038	6.2	2038	6.2	---	---
22	0310	1.6	0954	3.4	2128	6.1	2128	6.1	---	---
23	0356	1.6	1043	3.5	2216	5.7	2216	5.7	---	---
24	0441	1.4	1128	3.6	2304	5.2	2304	5.2	---	---
25	0525	1.1	1216	3.7	2356	4.6	---	---	---	---
26	0610	6	1304	3.8	---	---	---	---	---	---
27	0653	1	1351	4.0	---	---	---	---	---	---
28	0055	3.9	0733	4	1440	4.0	2041	1.9	---	---
29	0204	3.2	0815	1.0	1528	4.2	2213	1.6	---	---
30	0341	2.7	0904	1.5	1614	4.4	2329	1.1	---	---

* --- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

POINT MUGU TIDES

AUGUST 1990

34 DEG 07 MIN N, 119 DEG 07 MIN W - OCEAN PIER

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0054	6	0746	3.3	1119	2.9	1740	5.2
2	0130	2	0815	3.5	1217	2.8	1825	5.5
3	0202	-1	0833	3.6	1256	2.6	1902	5.8
4	0230	-4	0855	3.8	1335	2.4	1939	6.0
5	0258	-5	0917	3.9	1411	2.1	2014	6.0
6	0324	-5	0942	4.2	1450	1.9	2046	6.0
7	0352	-4	1006	4.4	1529	1.7	2123	5.8
8	0417	-2	1032	4.6	1612	1.5	2203	5.4
9	0446	-2	1101	4.8	1701	1.4	2245	4.8
10	0515	-7	1134	5.0	1758	1.3	2338	4.1
11	0544	1.2	1216	5.1	1909	1.3	---	---
12	0617	3.5	1256	5.2	2041	1.2	2041	1.2
13	0659	2.9	1335	5.3	2221	1.2	2221	1.2
14	0742	3.0	1411	5.5	2340	1.2	---	---
15	0829	3.3	1458	5.8	---	---	---	---
16	0916	3.6	1540	5.8	1748	6.1	1748	6.1
17	1003	4.0	1622	5.8	1841	6.3	1841	6.3
18	1050	4.3	1704	5.8	1930	6.4	1930	6.4
19	1137	4.6	1755	5.8	2014	6.3	2014	6.3
20	1224	4.8	1841	5.8	2056	6.1	2056	6.1
21	1311	5.0	1922	5.8	2135	5.7	2135	5.7
22	1358	5.1	1950	5.8	2214	5.1	2214	5.1
23	1445	5.1	2019	5.8	2253	4.4	2253	4.4
24	1532	5.0	2049	5.8	2336	3.8	2336	3.8
25	1619	4.9	2118	5.8	---	---	---	---
26	1706	4.7	2150	5.8	2018	1.6	2018	1.6
27	1753	4.5	2229	5.8	2211	1.4	2211	1.4
28	1840	4.5	2302	5.8	---	---	---	---
29	1927	4.6	---	---	---	---	---	---
30	2014	4.7	0726	3.1	1717	5.0	1717	5.0
31	2101	4.4	0739	3.7	1803	5.3	1803	5.3

* --- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

SNI - BARGE BEACH TIDES

AUGUST 1990

33 DEG 13 MIN N, 119 DEG 27 MIN W - SOUTHEAST BEACH

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0051	5	0759	3.0	1116	2.6	1753	4.8
2	0127	2	0828	3.2	1214	2.6	1838	5.0
3	0159	-1	0846	3.3	1253	2.4	1915	5.3
4	0227	-4	0908	3.5	1332	2.2	1952	5.5
5	0255	-4	0930	3.6	1408	1.9	2027	5.5
6	0321	-4	0955	3.9	1447	1.8	2059	5.5
7	0349	-4	1019	4.0	1526	1.6	2136	5.3
8	0414	-2	1045	4.2	1609	1.4	2216	4.9
9	0443	-2	1114	4.4	1658	1.3	2258	4.4
10	0512	6	1147	4.6	1755	1.2	2351	3.8
11	0541	1.1	1229	4.7	1906	1.2	---	---
12	0613	3.2	0613	1.6	1316	4.8	2038	1.1
13	0656	2.6	0656	2.1	1422	4.8	2218	1.7
14	0724	2.7	0811	2.5	1540	5.0	2337	1.2
15	0852	3.0	1008	2.6	1655	5.3	---	---
16	0933	4.4	0734	3.3	1134	2.5	1801	5.6
17	1018	7	0806	3.7	1235	2.1	1854	5.8
18	1100	8	0837	4.0	1326	1.8	1943	5.9
19	1136	8	0906	4.2	1411	1.4	2027	5.8
20	1209	6	0935	4.4	1455	1.2	2109	5.6
21	1240	4	1003	4.6	1537	1.1	2148	5.2
22	1311	1	1032	4.7	1619	1.1	2227	4.7
23	1343	5	1102	4.7	1701	1.1	2306	4.0
24	1418	1.1	1131	4.6	1752	1.2	2349	3.5
25	1458	1.6	1203	4.5	1852	1.4	---	---
26	1540	2.9	0539	2.0	1242	4.3	2015	1.5
27	1622	2.6	0538	2.5	1335	4.1	2208	1.3
28	1704	4.1	2329	1.0	---	---	---	---
29	1746	4.2	---	---	---	---	---	---
30	1828	4.6	0739	3.3	1113	2.8	1730	4.6
31	1910	4	0752	3.4	1206	2.6	1816	4.8

* --- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

POINT MUGU TIDES
SEPTEMBER 1990
34 DEG 07 MIN N, 119 DEG 07 MIN W - OCEAN PIER

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0126	1.1	0751	3.9	1249	2.4	1842	5.6	1842	5.6
2	0152	1.1	0809	4.2	1325	2.0	1920	5.8	1920	5.8
3	0217	1.2	0827	4.5	1400	1.5	1955	5.9	1955	5.9
4	0243	1.1	0849	4.9	1436	1.2	2034	5.8	2034	5.8
5	0311	0.0	0914	5.2	1517	.9	2113	5.5	2113	5.5
6	0336	1.4	0943	5.4	1600	.6	2158	5.0	2158	5.0
7	0405	.8	1014	5.6	1648	.5	2244	4.4	2244	4.4
8	0433	1.2	1046	5.7	1747	.5	2344	3.7	2344	3.7
9	0505	1.8	1128	5.6	1856	.6	---	---	---	---
10	0509	3.2	0539	2.4	1224	5.5	2029	.6	2029	.6
11	0333	3.1	0629	2.9	1342	5.3	2208	.4	2208	.4
12	0534	3.4	0849	3.2	1517	5.3	2322	0.0	2322	0.0
13	0620	3.7	1043	2.9	1640	5.5	---	---	---	---
14	0017	3.3	0654	4.1	1153	2.4	1746	5.7	1746	5.7
15	0057	4.4	0724	4.5	1246	1.9	1838	5.9	1838	5.9
16	0135	4.4	0749	4.8	1330	1.4	1923	5.8	1923	5.8
17	0204	4.2	0814	5.1	1409	1.0	2003	5.7	2003	5.7
18	0233	4.1	0839	5.3	1448	.7	2042	5.4	2042	5.4
19	0301	5.5	0903	5.5	1524	.6	2121	5.0	2121	5.0
20	0323	9.9	0926	5.5	1559	.5	2158	4.5	2158	4.5
21	0345	1.3	0951	5.4	1638	.6	2236	4.0	2236	4.0
22	0406	1.8	1016	5.3	1720	.8	2321	3.6	2321	3.6
23	0425	2.2	1043	5.1	1813	1.1	---	---	---	---
24	0027	3.1	0430	2.6	1113	4.8	1925	1.2	1925	1.2
25	1203	4.5	2108	1.2	---	---	---	---	---	---
26	1327	4.3	2237	1.1	---	---	---	---	---	---
27	0657	3.6	0936	3.5	1515	4.3	2330	.8	2330	.8
28	0642	3.7	1109	3.1	1639	4.5	0007	.5*	0007	.5*
29	0646	4.0	1156	2.6	1730	4.8	---	---	---	---
30	0038	.4	0700	4.3	1231	2.0	1817	5.1	1817	5.1

* --- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

SNI - BARGE BEACH TIDES
SEPTEMBER 1990
33 DEG 13 MIN N, 119 DEG 27 MIN W - SOUTHEAST BEACH

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0123	1.1	0804	3.6	1246	2.2	1855	5.1	1855	5.1
2	0149	1.1	0822	3.9	1322	1.8	1933	5.3	1933	5.3
3	0214	1.2	0840	4.1	1357	1.4	2008	5.4	2008	5.4
4	0240	1.1	0902	4.5	1433	1.1	2047	5.3	2047	5.3
5	0308	0.0	0927	4.8	1514	.8	2126	5.0	2126	5.0
6	0333	.4	0956	4.9	1557	.5	2211	4.6	2211	4.6
7	0402	.7	1027	5.1	1645	.4	2257	4.0	2257	4.0
8	0430	1.1	1059	5.2	1744	.4	2357	3.4	2357	3.4
9	0502	1.7	1141	5.1	1853	.5	---	---	---	---
10	0122	2.9	0536	2.2	1237	5.0	2026	.5	2026	.5
11	0346	2.8	0626	2.6	1355	4.8	2205	.4	2205	.4
12	0547	3.1	0846	2.9	1530	4.8	2319	0.0	2319	0.0
13	0633	3.4	1040	2.6	1653	5.0	---	---	---	---
14	0014	3.3	0707	3.8	1150	2.2	1759	5.2	1759	5.2
15	0054	4.4	0737	4.1	1243	1.8	1851	5.4	1851	5.4
16	0132	4.4	0802	4.4	1327	1.3	1936	5.3	1936	5.3
17	0201	4.2	0827	4.7	1406	.9	2016	5.2	2016	5.2
18	0230	4.1	0852	4.8	1445	.6	2055	4.9	2055	4.9
19	0258	4.4	0916	5.0	1521	.5	2134	4.6	2134	4.6
20	0320	.8	0939	5.0	1556	.4	2211	4.1	2211	4.1
21	0342	1.2	1004	4.9	1635	.5	2249	3.7	2249	3.7
22	0403	1.7	1029	4.8	1717	.7	2334	3.3	2334	3.3
23	0422	2.0	1056	4.7	1810	1.0	---	---	---	---
24	0040	2.8	0427	2.4	1126	4.4	1922	1.1	1922	1.1
25	1216	4.1	2105	1.1	---	---	---	---	---	---
26	1340	4.0	2234	1.0	---	---	---	---	---	---
27	0710	3.3	0933	3.2	1528	4.0	2327	.7	2327	.7
28	0655	3.4	1106	2.8	1652	4.1	0004	.4*	0004	.4*
29	0659	3.7	1153	2.4	1743	4.4	---	---	---	---
30	0035	.4	0713	4.0	1228	1.8	1830	4.7	1830	4.7

* --- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

POINT MUGU TIDES
OCTOBER 1990

34 DEG 07 MIN N, 119 DEG 07 MIN W - OCEAN PIER

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0103	3	0716	4.7	1210	1.4
2	0129	3	0738	5.1	1347	9
3	0157	4	0803	5.6	1423	3
4	0225	7	0828	6.0	1506	-1
5	0254	1.0	0900	6.1	1551	-4
6	0326	1.4	0935	6.2	1640	-5
7	0401	1.9	1014	6.1	1739	-3
8	0003	3.6	0433	2.3	1059	6.0
9	0141	3.3	0526	2.8	1200	5.6
10	0346	3.4	0659	3.2	1326	5.1
11	0501	3.7	0922	3.1	1505	4.9
12	0543	4.2	1055	2.6	1631	4.9
13	0615	4.6	1156	2.0	1737	5.0
14	0025	1	0645	5.0	1244	1.3
15	0057	3	0710	5.3	1326	9
16	0126	6	0734	5.5	1402	5
17	0153	1.0	0757	5.7	1440	2
18	0216	1.2	0821	5.8	1512	0.0
19	0240	1.6	0843	5.8	1544	0.0
20	0302	1.9	0906	5.7	1620	1
21	0317	2.2	0933	5.5	1702	3
22	0335	2.5	1000	5.3	1747	5
23	0039	3.1	0350	2.8	1032	5.0
24	1117	4.7	2002	9	-----	-----
25	1220	4.3	2118	9	-----	-----
26	0531	3.6	0855	3.5	1402	4.1
27	0538	3.8	1036	3.0	1542	4.1
28	0546	4.2	1130	2.3	1652	4.2
29	0604	4.7	1212	1.6	1748	4.3
30	0624	5.2	1251	9	1839	4.5
31	0039	9	0649	5.7	1332	1

* --- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

SNI - RARGE BEACH TIDES

OCTOBER 1990

33 DEG 13 MIN N, 119 DEG 27 MIN W - SOUTHEAST BEACH

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0100	3	0729	4.3	1307	1.3
2	0126	3	0751	4.7	1344	8
3	0154	4	0816	5.1	1420	3
4	0222	6	0841	5.5	1503	-1
5	0251	9	0913	5.6	1548	-4
6	0323	1.3	0948	5.7	1637	-4
7	0358	1.8	1027	5.6	1736	-3
8	0016	3.3	0430	2.1	1112	5.5
9	0154	3.0	0523	2.6	1213	5.1
10	0359	3.1	0656	2.9	1339	4.7
11	0514	3.4	0919	2.8	1518	4.5
12	0556	3.9	1052	2.4	1644	4.5
13	0628	4.2	1153	1.8	1750	4.6
14	0022	1	0658	4.6	1241	1.2
15	0054	3	0723	4.8	1323	8
16	0123	5	0747	5.0	1359	4
17	0150	9	0810	5.2	1437	2
18	0213	1.1	0834	5.3	1509	0.0
19	0237	1.5	0856	5.3	1541	0.0
20	0259	1.8	0919	5.2	1617	1
21	0314	2.0	0946	5.0	1659	3
22	0332	2.3	1013	4.8	1744	4
23	0052	2.8	0347	2.6	1045	4.6
24	1130	4.3	1959	8	-----	-----
25	1233	4.0	2115	8	-----	-----
26	0544	3.3	0852	3.2	1415	3.8
27	0551	3.5	1033	2.7	1555	3.8
28	0559	3.9	1127	2.1	1705	3.9
29	0617	4.3	1209	1.5	1801	4.0
30	0637	4.8	1248	8	1852	4.1
31	0036	8	0702	5.2	1329	1

* --- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

POINT MUGU TIDES
NOVEMBER 1990

34 DEG 07 MIN N, 119 DEG 07 MIN W - OCEAN PIER

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0111	1.1	0718	6.1	1414	-5	2020	4.4
2	0146	1.2	0752	6.5	1457	-1.0	2109	4.3
3	0221	1.5	0829	6.7	1545	-1.2	2203	4.0
4	0300	1.9	0908	6.7	1638	-1.2	2302	3.7
5	0339	2.2	0956	6.5	1734	-1.0	----	----
6	0415	3.6	1046	6.0	1838	-7	1838	-7
7	0434	3.6	1149	5.6	1949	-3	1949	-3
8	0504	3.7	1207	5.0	2058	0.0	2058	0.0
9	0546	4.1	1239	2.8	2202	-2	2202	-2
10	0604	4.5	1239	1.0	2253	-5	2253	-5
11	0630	4.9	1239	1.5	2337	-8	2337	-8
12	0657	5.2	1239	1.0	1914	3.9	1914	3.9
13	0723	5.8	1239	1.0	2000	3.8	2000	3.8
14	0748	5.9	1239	1.0	2039	3.7	2039	3.7
15	0812	5.9	1239	1.0	2118	3.6	2118	3.6
16	0841	5.8	1239	1.0	2200	3.6	2200	3.6
17	0910	5.7	1239	1.0	2239	3.4	2239	3.4
18	0941	5.5	1239	1.0	2328	3.3	2328	3.3
19	1013	5.2	1239	1.0	----	----	----	----
20	1046	4.8	1239	1.0	1814	-2	1814	-2
21	1117	4.4	1239	1.0	1906	-4	1906	-4
22	1147	4.4	1239	1.0	1958	-6	1958	-6
23	1215	4.0	1239	1.0	2047	-8	2047	-8
24	1243	3.6	1239	1.0	2140	-1.0	2140	-1.0
25	1311	3.6	1239	1.0	2223	-1.2	2223	-1.2
26	1339	3.6	1239	1.0	2306	-1.3	2306	-1.3
27	1407	3.6	1239	1.0	2351	-1.5	2351	-1.5
28	1435	3.6	1239	1.0	----	----	----	----
29	1503	3.8	1239	1.0	2024	3.8	2024	3.8
30	1531	4.1	1239	1.0	1406	-1.1	1406	-1.1

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

SNI - BARGE BEACH TIDES
NOVEMBER 1990

33 DEG 13 MIN N, 119 DEG 27 MIN W - SOUTHEAST BEACH

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0108	1.0	0731	5.6	1411	-4	2033	4.0
2	0143	1.1	0805	6.0	1454	-9	2122	4.0
3	0218	1.4	0842	6.2	1542	-1.1	2216	3.7
4	0257	1.8	0921	6.2	1635	-1.1	2315	3.4
5	0336	2.0	1009	6.0	1731	-9	----	----
6	0428	3.3	1045	2.4	1835	-6	1835	-6
7	0517	3.3	1053	2.6	1946	-3	1946	-3
8	0607	3.4	1117	2.8	2055	0.0	2055	0.0
9	0657	3.8	1147	1.4	2159	-2	2159	-2
10	0748	4.1	1236	-9	2250	-4	2250	-4
11	0841	4.5	1318	-4	2334	-7	2334	-7
12	0936	4.8	1356	-1	----	----	----	----
13	1031	5.0	1428	-2	1927	3.6	1927	3.6
14	1126	5.3	1500	-3	2013	3.5	2013	3.5
15	1221	5.4	1533	-4	2052	3.4	2052	3.4
16	1316	5.4	1608	-3	2131	3.3	2131	3.3
17	1411	5.3	1646	-2	2213	3.3	2213	3.3
18	1506	5.0	1728	0.0	2252	3.1	2252	3.1
19	1601	4.8	1811	-2	2341	3.0	2341	3.0
20	1656	4.4	1903	-4	----	----	----	----
21	1751	4.0	1955	-5	1811	-2	1811	-2
22	1846	3.7	2044	-7	1903	-4	1903	-4
23	1941	3.3	2137	-9	1955	-5	1955	-5
24	2036	3.3	2220	-1.1	2044	-7	2044	-7
25	2131	3.3	2303	-1.2	2137	-9	2137	-9
26	2226	3.3	2348	-1.4	2220	-1.1	2220	-1.1
27	2321	3.5	----	----	2303	-1.2	2303	-1.2
28	0016	3.5	1403	-1.0	2348	-1.4	2348	-1.4
29	0111	3.5	1403	-1.0	----	----	----	----
30	0206	3.5	1403	-1.0	2037	3.5	2037	3.5

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

POINT MUGU TIDES
DECEMBER 1990

34 DEG 07 MIN N, 119 DEG 07 MIN W - OCEAN PIER

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0114	1.8	0729	6.8	1452	-1.4
2	0159	1.9	0811	7.0	1543	-1.6
3	0245	2.0	0858	6.9	1632	-1.6
4	0337	2.2	0946	6.6	1721	-1.3
5	0403	3.8	0943	2.4	1040	6.1
6	0102	3.9	0542	2.5	1136	5.5
7	0201	4.0	0708	2.6	1242	4.7
8	0300	4.3	0846	2.4	1404	4.0
9	0352	4.6	1022	1.9	1534	3.6
10	0439	4.9	1138	1.3	1707	3.3
11	0516	5.2	1230	.8	1822	3.3
12	0553	5.4	1313	.3	1921	3.4
13	0625	5.6	1351	-1.1	2012	3.4
14	0642	2.2	0655	5.7	1426	-4
15	0114	2.3	0726	5.8	1457	-5
16	0146	2.4	0755	5.9	1529	-6
17	0218	2.4	0827	5.9	1602	-6
18	0250	2.5	0900	5.8	1633	-5
19	0325	2.5	0932	5.6	1707	-4
20	0404	2.6	1004	5.4	1742	-2
21	0426	3.6	0449	2.7	1041	5.0
22	0108	3.6	0550	2.7	1123	4.4
23	0150	3.9	0711	2.6	1221	3.8
24	0232	4.2	0849	2.3	1344	3.3
25	0318	4.6	1022	1.6	1536	3.0
26	0405	5.0	1131	.9	1724	3.0
27	0450	5.6	1227	0.0	1838	3.2
28	0540	6.0	1318	-8	1942	3.4
29	0628	6.5	1404	-1.3	2031	3.6
30	0058	2.1	0716	6.8	1450	-1.7
31	0154	2.0	0805	7.0	1535	-1.8

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

SNI - BARGE BEACH TIDES

DECEMBER 1990
33 DEG 13 MIN N, 119 DEG 27 MIN W - SOUTHEAST BEACH

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0111	1.7	0742	6.2	1449	-1.3
2	0156	1.8	0824	6.4	1540	-1.5
3	0242	1.8	0911	6.3	1629	-1.5
4	0334	2.0	0959	6.1	1718	-1.2
5	0016	3.5	0430	2.2	1053	5.6
6	0115	3.6	0539	2.3	1149	5.0
7	0214	3.7	0705	2.4	1255	4.3
8	0313	4.0	0843	2.2	1417	3.7
9	0405	4.2	1019	1.8	1547	3.3
10	0452	4.5	1135	1.2	1720	3.0
11	0529	4.8	1227	.7	1835	3.0
12	0606	4.9	1310	.3	1934	3.1
13	0638	5.1	1348	-1.1	2025	3.1
14	0039	2.0	0708	5.2	1423	-4
15	0111	2.1	0739	5.3	1454	-4
16	0143	2.2	0808	5.4	1526	-5
17	0215	2.2	0840	5.4	1559	-5
18	0247	2.3	0913	5.3	1630	-4
19	0322	2.3	0945	5.1	1704	-4
20	0401	2.4	1017	4.9	1739	-2
21	0039	3.3	0446	2.5	1054	4.6
22	0121	3.3	0547	2.5	1136	4.0
23	0203	3.6	0708	2.4	1234	3.5
24	0245	3.9	0846	2.1	1357	3.0
25	0331	4.2	1019	1.5	1549	2.7
26	0418	4.6	1128	.8	1737	2.7
27	0503	5.1	1224	0.0	1851	2.9
28	0553	5.5	1315	-7	1955	3.1
29	0641	6.0	1401	-1.2	2044	3.3
30	0055	1.9	0729	6.2	1447	-1.6
31	0151	1.8	0818	6.4	1532	-1.7

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

Barking Sands Training Area, Kauai, Hawaiian Islands
Moonrise and Moonset for 1990
Hawaii-Aleutian Standard Time

Latitude 22 02 N
Longitude 159 47 W

Nautical Almanac Office
U.S. Naval Observatory
Washington, D.C. 20392-5100

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Day	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set
	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m
1	1042 2246	1113	0956 2338	1135 0042	1232 0108	1359 0130	1426 0107	1550 0147	1651 0312	1639 0348	1708 0528	1731 0627
2	1117 2344	1158 0041	1045	1238 0138	1328 0148	1449 0201	1518 0143	1642 0237	1731 0409	1716 0445	1756 0634	1836 0736
3	1153	1248 0146	1140 0044	1339 0227	1421 0224	1540 0234	1612 0222	1730 0331	1808 0506	1754 0544	1851 0743	1945 0842
4	1232 0042	1345 0251	1240 0148	1437 0310	1512 0257	1631 0308	1705 0306	1815 0427	1845 0603	1835 0645	1952 0853	2053 0941
5	1313 0144	1446 0354	1342 0248	1532 0348	1603 0328	1724 0344	1758 0353	1856 0524	1921 0701	1919 0749	2058 1000	2158 1032
6	1401 0248	1549 0453	1444 0342	1625 0422	1653 0400	1818 0425	1848 0445	1935 0621	1959 0800	2009 0856	2205 1100	2259 1116
7	1455 0355	1653 0546	1544 0429	1716 0455	1744 0432	1911 0509	1935 0540	2011 0718	2040 0900	2105 1004	2309 1154	2356 1155
8	1555 0502	1754 0632	1642 0510	1806 0526	1836 0507	2003 0558	2018 0636	2047 0814	2125 1004	2206 1110	2400 1240	2431 1231
9	1659 0605	1851 0712	1737 0547	1857 0558	1929 0545	2052 0651	2058 0733	2122 0911	2216 1109	2310 1213	0010 1320	0050 1305
10	1805 0704	1946 0748	1829 0621	1948 0631	2023 0626	2137 0746	2135 0829	2200 1009	2312 1215	1309	0108 1356	0143 1338
11	1908 0754	2038 0822	1921 0653	2041 0706	2116 0712	2219 0842	2210 0924	2241 1109	1319	0014 1358	0202 1430	0234 1412
12	2008 0838	2129 0853	2012 0725	2134 0745	2207 0802	2257 0938	2245 1020	2327 1211	0013 1418	0116 1441	0255 1503	0326 1448
13	2105 0917	2220 0925	2103 0757	2228 0828	2254 0855	2333 1033	2321 1116	1316	0117 1512	0215 1519	0346 1536	0419 1527
14	2158 0952	2311 0958	2155 0831	2320 0915	2338 0951	1128	2359 1214	0019 1422	0220 1559	0312 1555	0438 1611	0512 1610
15	2249 1024	1032	2248 0907	1006	1046	0009 1224	1315	0117 1525	0322 1641	0406 1628	0530 1648	0605 1657
16	2339 1055	0004 1110	2342 0947	0011 1101	0019 1142	0044 1321	0042 1419	0220 1624	0421 1719	0458 1701	0624 1728	0657 1746
17	1127	0057 1152	1032	0058 1157	0057 1239	0121 1421	0130 1525	0325 1717	0517 1754	0550 1755	0717 1812	0747 1839
18	0030 1200	0151 1239	0035 1121	0141 1254	0134 1335	0202 1525	0226 1632	0430 1803	0612 1828	0643 1811	0810 1900	0833 1933
19	0121 1236	0245 1330	0128 1214	0222 1352	0209 1433	0248 1633	0327 1736	0532 1844	0705 1901	0736 1849	0901 1951	0915 2027
20	0214 1315	0338 1426	0218 1310	0300 1450	0247 1533	0341 1742	0434 1844	0632 1921	0758 1936	0830 1930	0950 2044	0954 2120
21	0308 1359	0428 1525	0305 1408	0338 1549	0326 1637	0441 1850	0541 1926	0728 1956	0851 2012	0923 2016	1035 2137	1030 2213
22	0403 1449	0514 1625	0348 1508	0415 1649	0411 1745	0547 1953	0646 2010	0822 2030	0944 2051	1016 2104	1116 2231	1105 2306
23	0457 1543	0557 1725	0429 1607	0454 1753	0501 1855	0655 2049	0748 2050	0915 2103	1038 2134	1106 2156	1154 2325	1139 2359
24	0549 1641	0637 1825	0507 1707	0537 1900	0559 2006	0802 2136	0846 2125	1007 2138	1131 2221	1154 2249	1230	1213
25	0638 1741	0715 1926	0545 1808	0625 2010	0702 2112	0905 2218	0941 2159	1100 2215	1223 2211	1238 2344	1305 0018	1250 0055
26	0722 1841	0752 2026	0624 1911	0719 2121	0810 2211	1004 2255	1034 2232	1154 2256	1313	1318	1340 0112	1330 0153
27	0803 1941	0831 2128	0704 2016	0818 2228	0916 2301	1059 2329	1126 2306	1247 2340	1400 0004	1357 0039	1416 0208	1417 0255
28	0842 2039	0911 2232	0749 2123	0923 2329	1020 2345	1152	1218 2341	1341	1444 0059	1433 0134	1456 0307	1510 0402
29	0918 2138		0838 2232	1028	1120	1243 0001	1310	1433 0028	1524 0155	1509 0229	1541 0410	1611 0510
30	0955 2237		0933 2339	1132 0023	1215 0023	1334 0034	1403 0019	1522 0120	1602 0251	1546 0326	1632 0517	1718 0618
31	1032 2338		1033		1308 0057		1457 0101	1608 0215		1625 0425		1828 0721

PORT ALLEN TIDES
JANUARY 1990

21 DEG 54 MIN N, 159 DEG 35 MIN W - HANAPEPE BAY

DATE	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT
1	0616	1.7	1346	.1	1933	.9	---	---
2	0026	.4	0654	1.5	1418	0.0	2046	1.0
3	0154	.6	0733	1.3	1457	0.0	2202	1.3
4	0356	.8	0822	1.0	1536	-.1	2310	1.5
5	0611	.7	0924	.8	1622	-.1	---	---
6	0006	1.7	0750	.5	1047	.6	1711	-.2
7	0059	2.0	0850	.3	1206	.5	1801	-.2
8	0146	2.1	0932	.3	1315	.5	1851	-.2
9	0230	2.2	1011	.2	1413	.5	1947	-.2
10	0311	2.2	1046	.1	1506	.5	2032	-.2
11	0351	2.1	1121	.1	1554	.6	2114	-.1
12	0427	2.0	1152	.1	1643	.7	2203	0.0
13	0502	1.9	1221	.1	1732	.8	2246	-.2
14	0534	1.7	1253	.1	1827	.9	---	---
15	2337	.3*	0606	1.5	1322	.1	1927	.9
16	0033	.5	0634	1.3	1351	.1	2036	1.0
17	0151	.7	0703	1.0	1423	.2	2148	1.1
18	0354	.8	0724	.9	1456	.2	2254	1.3
19	1542	.2	---	---	---	---	---	---
20	2350	1.4	1631	.1	---	---	---	---
21	0037	1.6	0857	.4	1123	.5	1721	.1
22	0117	1.7	0918	.3	1232	.5	1814	0.0
23	0153	1.9	0937	.3	1320	.5	1856	-.1
24	0227	2.0	0958	.3	1405	.6	1941	-.1
25	0301	2.0	1023	.2	1447	.6	2021	-.1
26	0332	2.0	1048	.1	1529	.7	2106	-.1
27	0404	2.0	1114	.1	1616	.8	2148	0.0
28	0436	1.9	1141	0.0	1703	.9	2236	.1
29	0509	1.7	1211	0.0	1755	1.0	2333	.3
30	0544	1.4	1242	0.0	1858	1.1	---	---
31	0041	.4	0615	1.2	1316	-.1	2007	1.3

* -- TIDE OCCURS ON PREVIOUS DATE.

PORT ALLEN TIDES

FEBRUARY 1990

21 DEG 54 MIN N, 159 DEG 35 MIN W - HANAPEPE BAY

DATE	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT
1	0215	.6	0651	.9	1354	-.1	2126	1.4
2	0440	.6	0729	.7	1440	0.0	2245	1.6
3	1542	0.0	---	---	---	---	---	---
4	2350	1.8*	0813	.3	1102	.4	1649	0.0
5	0046	1.9	0845	.3	1232	.4	1754	-.1
6	0133	2.0	0916	.2	1330	.5	1854	-.1
7	0215	2.0	0942	.1	1420	.6	1944	-.1
8	0251	2.0	1009	.1	1503	.8	2030	-.1
9	0326	1.9	1032	0.0	1542	.9	2116	0.0
10	0355	1.8	1056	0.0	1621	.9	2158	.1
11	0426	1.6	1119	0.0	1700	1.0	2243	.2
12	0455	1.4	1144	0.0	1742	1.1	2332	.3
13	0521	1.3	1207	.1	1827	1.1	---	---
14	0024	.4	0546	1.0	1229	.1	1919	1.2
15	0138	.6	0607	.7	1301	.1	2025	1.2
16	0339	.6	0618	.7	1332	.2	2148	1.3
17	1426	.2	2300	1.4	---	---	---	---
18	1537	.2	---	---	---	---	---	---
19	2358	1.5*	0824	.3	1123	.4	1650	.2
20	0042	1.6	0835	.3	1225	.5	1752	.1
21	0121	1.7	0851	.2	1312	.6	1844	0.0
22	0153	1.8	0912	.2	1355	.7	1929	-.1
23	0229	1.8	0930	.1	1434	.9	2018	-.1
24	0301	1.8	0953	0.0	1513	1.0	2107	-.1
25	0333	1.7	1018	-.1	1559	1.1	2154	0.0
26	0405	1.5	1046	-.1	1645	1.3	2248	-.1
27	0439	1.4	1112	-.2	1733	1.4	---	---
28	2349	.3*	0511	1.1	1144	-.2	1829	1.4

* -- TIDE OCCURS ON PREVIOUS DATE.

PORT ALLEN TIDES										PORT ALLEN TIDES									
MARCH 1990										APRIL 1990									
21 DEG 54 MIN N. 159 DEG 35 MIN W - HANAPEPE BAY										21 DEG 54 MIN N. 159 DEG 35 MIN W - HANAPEPE BAY									
DATE	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT	DATE	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT				
1	0108	.4	0546	.9	1217	.1	1937	1.5	1	0500	.2	0833	.3	1328	.1				
2	0254	.5	0628	.6	1302	.1	2054	1.5	2	0606	.1	1045	.3	1502	.2				
3	0529	.3	0727	.4	1358	0.0	2215	1.6	3	0641	0.0	1158	.5	1641	.3				
4	0705	.3	0954	.3	1517	.1	---	---	4	2346	1.4*	0713	0.0	1758	---				
5	2326	1.7*	0740	.2	1147	.4	1643	.1	5	0032	1.4	0737	.1	1326	.9				
6	0024	1.7	0805	.1	1249	.5	1759	.1	6	0110	1.4	0800	.1	1400	1.0				
7	0109	1.7	0834	.1	1334	.7	1858	0.0	7	0142	1.2	0818	.1	1431	1.2				
8	0151	1.7	0856	0.0	1413	.9	1950	0.0	8	0215	1.1	0837	.1	1500	1.4				
9	0223	1.6	0917	0.0	1448	.9	2035	0.0	9	0243	.9	0857	.1	1529	1.4				
10	0253	1.5	0936	0.0	1520	1.1	2118	.1	10	0311	.9	0916	.1	1602	1.4				
11	0322	1.4	0958	.1	1555	1.2	2201	.1	11	0343	.7	0940	.1	1637	1.5				
12	0350	1.2	1016	0.0	1627	1.3	2245	.2	12	2341	.2*	0412	.6	1002	.1				
13	0415	1.1	1036	0.0	1703	1.4	2331	.3	13	0038	.3	0440	.5	1030	0.0				
14	0444	.9	1058	0.0	1745	1.4	---	---	14	0146	.3	0512	.4	1056	0.0				
15	0508	.3	1059	.8	1123	0.0	1830	1.4	15	0318	.3	0605	.3	1133	.1				
16	0141	.4	0528	.6	1148	.1	1929	1.3	16	0448	.2	0745	.3	1226	.2				
17	0341	.4	0546	.5	1220	.1	2041	1.3	17	0526	.2	0956	.3	1352	.3				
18	1311	.2	2256	1.4	---	---	---	---	18	0555	.1	1109	.5	1538	.3				
19	0703	.3	0945	.3	1441	.2	2301	1.4	19	0620	0.0	1158	.7	1704	.3				
20	0711	.3	1123	.4	1614	.2	---	---	20	2334	1.3*	0642	.1	1238	.9				
21	2351	1.4*	0730	.2	1216	.5	1726	.2	21	0018	1.3	0707	.2	1317	1.1				
22	0033	1.5	0751	.1	1258	.7	1829	.1	22	0100	1.1	0732	.3	1357	1.4				
23	0112	1.5	0809	0.0	1337	.9	1924	0.0	23	0142	.9	0800	.3	1442	1.6				
24	0146	1.5	0832	.1	1416	1.1	2016	0.0	24	0224	.9	0831	.3	1525	1.8				
25	0221	1.4	0856	.2	1455	1.3	2109	0.0	25	0307	.7	0906	.3	1610	1.9				
26	0300	1.3	0924	.3	1540	1.4	2205	0.0	26	0351	.5	0942	.3	1659	2.0				
27	0335	1.1	0951	.3	1627	1.6	2306	.1	27	0036	0.0	0440	.4	1020	.3				
28	0414	.9	1021	.3	1717	1.7	---	---	28	0151	.1	0546	.3	1105	.2				
29	0015	.2	0452	.7	1056	.3	1810	1.7	29	0307	0.0	0711	.3	1200	0.0				
30	0137	.3	0538	.5	1135	.2	1914	1.7	30	0411	0.0	0901	.3	1310	.2				
31	0317	.3	0641	.3	1221	.1	2025	1.6						2057	1.5				

* --- TIDE OCCURS ON PREVIOUS DATE.

* --- TIDE OCCURS ON PREVIOUS DATE.

MAY 1950
21 DEG 51 MIN N. 159 DEG 35 MIN W - HANAPEPE BAY

• - - TIDE OCCURS ON PREVIOUS DATE.

21 DEG 54 MIN N, 159 DEG 35 MIN W - HANAPEPE BAY

• -- TIDE OCCURS ON PREVIOUS DATE.

PORT ALLEN TIDES

JULY 1990

21 DEG 54 MIN N, 159 DEG 35 MIN W - HANAPEPE BAY

DATE	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT
1	0426	0.0	1209	1.4	1940	.5	2212	.6
2	0502	0.0	1251	1.5	2042	.4	2321	.5
3	0538	0.0	1330	1.7	2124	.3	---	---
4	0617	.5	0617	0.0	1405	1.8	2153	.3
5	0117	.4	0659	-.1	1437	1.9	2224	.3
6	0205	.5	0738	-.1	1511	2.0	2250	.3
7	0247	.5	0816	-.1	1543	2.0	2318	.2
8	0327	.5	0854	-.1	1615	2.0	---	---
9	0347	.2*	0413	.6	0936	0.0	1647	1.9
10	0015	.1	0502	.7	1015	.1	1721	1.8
11	0044	.7	0557	.8	1104	.3	1753	1.7
12	0115	.1	0657	.9	1203	.4	1825	1.4
13	0147	0.0	0809	1.0	1319	.6	1903	1.3
14	0223	0.0	0918	1.2	1504	.7	1945	1.0
15	0258	0.0	1030	1.4	1718	.7	2034	.8
16	0343	-.1	1132	1.7	1917	.5	2153	.6
17	0434	-.1	1229	1.9	2027	.4	---	---
18	2326	.5*	0529	-.2	1317	2.0	2112	.3
19	0045	.5	0625	-.2	1405	2.2	2149	.2
20	0146	.5	0720	-.2	1449	2.2	2223	.1
21	0242	.6	0809	-.2	1530	2.2	2257	.1
22	0331	.7	0901	-.1	1609	2.1	2328	.1
23	0423	.8	0950	0.0	1645	2.0	---	---
24	2358	1*	0512	.9	1036	.2	1717	1.8
25	0028	.1	0607	.9	1128	.3	1753	1.5
26	0059	.1	0703	1.0	1228	.5	1821	1.3
27	012	.2	0806	1.1	1345	.7	1853	1.1
28	0200	.2	0917	1.3	1538	.8	1918	.9
29	0235	.2	1027	1.4	---	---	---	---
30	0318	.2	1129	1.5	---	---	---	---
31	0411	.2	1219	1.6	2040	.4	2316	.5

* - TIDE OCCURS ON PREVIOUS DATE.

PORT ALLEN TIDES

AUGUST 1990

21 DEG 54 MIN N, 159 DEG 35 MIN W - HANAPEPE BAY

DATE	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT
1	0505	.2	1301	1.7	2059	.4	---	---
2	0025	.6	0558	.2	1340	1.9	2124	.3
3	0112	.6	0646	.1	1413	2.0	2144	.3
4	0155	.7	0728	0.0	1444	2.0	2204	.3
5	0233	.8	0810	0.0	1515	2.0	2226	.3
6	0315	.9	0850	.1	1545	2.0	2251	.2
7	0357	.9	0935	.1	1616	1.9	2315	.2
8	0440	1.0	1020	.3	1648	1.7	---	---
9	2341	1*	0529	1.2	1113	.3	1720	1.5
10	0013	.1	0624	1.3	1216	.5	1752	1.3
11	0041	.1	0727	1.4	1340	.7	1827	1.1
12	0117	.1	0842	1.5	1546	.8	1906	.9
13	0207	.1	1002	1.7	1817	.6	2009	.7
14	0302	.1	1111	1.9	1933	.4	2218	.5
15	0411	.1	1213	2.0	2015	.3	---	---
16	2355	.6*	0520	.1	1303	2.0	2040	.3
17	0101	.7	0626	.1	1348	2.1	2114	.3
18	0152	.8	0722	.1	1427	2.1	2140	.2
19	0239	.9	0814	.1	1504	2.0	2205	.2
20	0318	1.0	0859	.1	1538	1.9	2230	.2
21	0400	1.2	0948	.3	1607	1.7	2256	.2
22	0443	1.3	1035	.3	1639	1.5	2320	.2
23	0525	1.4	1125	.4	1704	1.4	---	---
24	2344	.2*	0611	1.4	1224	.6	1735	1.1
25	0008	.3	0703	1.4	1338	.7	1757	.9
26	0037	.3	0809	1.4	1536	.7	1815	.8
27	0112	.3	0921	1.4	---	---	---	---
28	0205	.3	1036	1.5	1936	.5	2145	.6
29	0322	.4	1139	1.6	1953	.5	---	---
30	2327	.6*	0440	.3	1224	1.7	2013	.4
31	0022	.7	0537	.3	1301	1.8	2029	.4

* - TIDE OCCURS ON PREVIOUS DATE.

PORT ALLEN TIDES
SEPTEMBER 1990
21 DEG 54 MIN N, 159 DEG 35 MIN W - HANAPEPE BAY

DATE	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT
1	0101	.8	0634	.3	1336	1.9	2046	.3
2	0141	.9	0720	.2	1405	1.9	2106	.3
3	0217	1.1	0805	.2	1437	1.9	2126	.2
4	0256	1.2	0848	.2	1509	1.8	2148	.2
5	0336	1.4	0937	.3	1541	1.6	2216	.1
6	0418	1.5	1028	.3	1613	1.4	2242	.1
7	0506	1.6	1128	.4	1648	1.3	2311	.1
8	0559	1.7	1239	.5	1723	1.0	---	---
9	0639	1.8	0101	1.8	1415	.6	1802	.9
10	0729	2.0	0814	1.8	1632	.6	1905	.7
11	0818	2.2	0933	1.9	1814	.5	2114	.6
12	0918	2.3	1046	1.9	1900	.3	2313	.6
13	1018	2.4	1147	2.0	1934	.3	---	---
14	1118	2.5	1247	2.1	2001	.3	2001	.3
15	1218	2.6	0128	2.2	2026	.2	2026	.2
16	1318	2.7	0228	2.3	2047	.2	2047	.2
17	1418	2.8	0328	2.4	2109	.2	2109	.2
18	1518	2.9	0428	2.5	2131	.2	2131	.2
19	1618	3.0	0528	2.6	2152	.2	2152	.2
20	1718	3.1	0628	2.7	2212	.2	2212	.2
21	1818	3.2	0728	2.8	2234	.3	2234	.3
22	1918	3.3	0828	2.9	2259	.3	2259	.3
23	2018	3.4	0928	3.0	2324	.3	2324	.3
24	2118	3.5	1028	3.1	---	---	---	---
25	2218	3.6	1128	3.2	---	---	---	---
26	2318	3.7	1228	3.3	---	---	---	---
27	0019	3.8	0128	3.4	---	---	---	---
28	0119	3.9	0228	3.5	---	---	---	---
29	0219	4.0	0328	3.6	---	---	---	---
30	0319	4.1	0428	3.7	---	---	---	---

* --- TIDE OCCURS ON PREVIOUS DATE.

PORT ALLEN TIDES
OCTOBER 1990
21 DEG 54 MIN N, 159 DEG 35 MIN W - HANAPEPE BAY

DATE	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT
1	0121	1.2	0708	.3	1322	1.6	2005	.2
2	0159	1.4	0800	.3	1354	1.5	2027	.1
3	0235	1.6	0852	.3	1430	1.4	2053	0.0
4	0317	1.8	0945	.3	1508	1.3	2121	0.0
5	0359	1.9	1042	.3	1544	1.1	2150	0.0
6	0448	2.0	1148	.4	1622	.9	2225	0.0
7	0540	2.0	1309	.4	1708	.8	2301	.1
8	0639	2.0	1444	.4	1810	.6	---	---
9	0748	2.0	0748	2.0	1823	.4	1958	.5
10	0848	2.1	0901	1.9	1729	.3	2209	.6
11	0921	2.2	1011	1.8	1811	.3	---	---
12	1004	2.3	1107	.5	1908	.2	1843	.2
13	1044	2.4	1207	.5	2008	.2	1908	.2
14	1104	2.5	1309	.4	2108	.2	1931	.1
15	1141	2.6	1407	.4	2208	.2	1954	.1
16	1218	2.7	1507	.4	2308	.2	2013	.1
17	1244	2.8	1607	.4	2408	.2	2033	.1
18	1315	2.9	1707	.4	2508	.2	2055	.1
19	1348	3.0	1807	.4	2608	.2	2117	.1
20	1421	3.1	1907	.4	2708	.2	2141	.2
21	1459	3.2	2007	.4	2808	.2	2207	.2
22	1541	3.3	2107	.4	2908	.2	2236	.3
23	1621	3.4	2207	.4	3008	.2	2310	.3
24	1701	3.5	2307	.4	3108	.2	---	---
25	1741	3.6	2407	.4	3208	.2	---	---
26	1821	3.7	2507	.4	3308	.2	---	---
27	1901	3.8	2607	.4	3408	.2	---	---
28	1941	3.9	2707	.4	3508	.2	---	---
29	2021	4.0	2807	.4	3608	.2	---	---
30	2101	4.1	2907	.4	3708	.2	---	---
31	2141	4.2	3007	.4	3808	.2	---	---

* --- TIDE OCCURS ON PREVIOUS DATE.

PORT ALLEN TIDES
NOVEMBER 1990
21 DEG 54 MIN N, 159 DEG 35 MIN W - HANAPEPE BAY

DATE	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT
1	0218	1.9	0903	.3	1354	1.0	2003	-.1
2	0301	2.0	1002	.3	1439	.9	2036	-.2
3	0346	2.2	1102	.3	1521	.8	2112	-.2
4	0435	2.2	1206	.3	1610	.6	2150	-.1
5	0526	2.2	1319	.3	1709	.5	2235	0.0
6	0621	2.1	1435	.3	1830	.5	2325	.2
7	0720	2.0	1541	.3	1921	.5	2400	-.1
8	0829	.3	0823	1.9	1629	.2	2207	.7
9	0209	.5	0922	1.7	1708	.2	2319	.9
10	0359	.6	1020	1.5	1742	.1	2400	-.1
11	0511	1.1	0535	.6	1109	1.4	1811	.1
12	0653	1.4	0652	.6	1155	1.2	1835	.1
13	0126	1.5	0752	.5	1237	1.0	1858	0.0
14	0154	1.7	0844	.5	1312	.9	1920	0.0
15	0226	1.8	0930	.4	1347	.8	1944	0.0
16	0258	1.9	1015	.4	1423	.7	2010	0.0
17	0330	2.0	1101	.3	1455	.7	2037	0.0
18	0405	2.0	1146	.3	1536	.6	2106	.1
19	0440	2.0	1232	.3	1612	.6	2138	.1
20	0520	1.9	1324	.3	1705	.5	2211	.2
21	0601	1.8	1413	.3	1809	.5	2251	.3
22	0644	1.7	1504	.3	1932	.5	2300	-.1
23	0729	1.6	0729	1.6	1543	.3	2107	.7
24	0815	1.5	0815	1.5	1612	.2	2223	.9
25	0908	1.4	0908	1.4	1641	.2	2316	1.0
26	0959	1.3	0959	1.3	1709	.1	2400	-.1
27	1049	1.1	1049	1.1	1740	0.0	2400	0.0
28	1144	.9	1144	.9	1811	-.1	2400	-.1
29	1236	.9	1236	.9	1847	-.2	2400	-.2
30	1328	.7	1328	.7	1926	-.3	2400	-.3

* -- TIDE OCCURS ON PREVIOUS DATE.

PORT ALLEN TIDES
DECEMBER 1990
21 DEG 54 MIN N, 159 DEG 35 MIN W - HANAPEPE BAY

DATE	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT
1	0249	2.2	1020	.3	1421	.6	2007	-.3
2	0335	2.3	1112	.2	1513	.5	2052	-.3
3	0423	2.3	1208	.2	1611	.5	2137	-.2
4	0509	2.3	1300	.1	1717	.5	2226	0.0
5	0559	2.1	1352	.1	1831	.5	2320	.2
6	0648	2.0	1441	.1	1958	.7	2400	-.1
7	0736	1.7	0736	1.7	1523	.1	2130	.9
8	0825	1.4	0825	1.4	1602	.1	2244	1.0
9	0917	1.2	0917	1.2	1639	.1	2300	-.1
10	1006	1.0	1006	1.0	1709	.1	2350	0.0
11	1025	1.4	0708	.7	1102	.9	1740	0.0
12	0105	1.6	0817	.5	1152	.7	1809	0.0
13	0141	1.8	0910	.4	1243	.6	1838	0.0
14	0213	1.9	0948	.3	1328	.6	1911	0.0
15	0245	2.0	1024	.3	1407	.6	1943	0.0
16	0317	2.0	1059	.3	1449	.5	2018	0.0
17	0350	2.0	1133	.3	1527	.5	2053	0.0
18	0424	2.0	1206	.3	1613	.5	2129	.1
19	0458	2.0	1241	.3	1659	.6	2204	.1
20	0533	1.9	1317	.2	1752	.6	2246	.3
21	0605	1.8	1348	.2	1859	.7	2300	-.1
22	0641	1.6	0641	1.6	1420	.2	2011	.8
23	0716	1.4	0716	1.4	1454	.1	2124	.9
24	0755	1.3	0755	1.3	1529	.1	2233	1.2
25	0847	1.0	0847	1.0	1605	0.0	2300	-.1
26	0936	.7	0936	.7	1644	-.1	2350	0.0
27	1024	.5	1024	.5	1729	-.2	2400	-.2
28	1112	.3	1112	.3	1817	-.3	2400	-.3
29	1200	.3	1200	.3	1902	-.3	2400	-.3
30	1248	.2	1248	.2	1955	-.3	2400	-.3
31	1336	.1	1336	.1	2043	-.3	2400	-.3

* -- TIDE OCCURS ON PREVIOUS DATE.

APPENDIX A

HEIGHT OF THE TIDE AT ANY TIME

The height of the tide at times intermediate to the times of high and low water is needed on occasion, and may be computed by numerical methods. An example of the method, (adapted from table 3 of the data source), is presented here, using the predicted tides for a day at Point Mugu.

Problem: Given that the predicted times and heights of the tides are:

TIME	HEIGHT
0039	4.9
0814	0.2
1510	3.1
1933	2.4

What is the height of the tide at 0300?

Numerical Method

The duration of fall is $08\text{h } 14\text{m} - 00\text{h } 39\text{m} = 7\text{h } 35\text{m}$

The time after high water is $03\text{h } 00\text{m} - 00\text{h } 39\text{m} = 2\text{h } 21\text{m}$

The range of tide is $4.9 - 0.2 = 4.7$ feet

Entering table A-1 at the duration of fall of 7h 40m, which is the nearest value to 7h 35m, the nearest value on the horizontal line to 2h 21m is 2h 18m after high water. Following down this column to its intersection with a range of 4.5 feet which is the nearest value to 4.7 feet, one obtains 0.9 which, being calculated from high water, must be subtracted from 4.9. The approximate height at 0300 is therefore 4.0 feet.

When the duration of rise or fall is greater than 10h 40m, enter the table with one-half the given duration and with one-half the time from nearest high or low water; but if the duration of rise or fall is less than 4h 00m, enter the table with double the given duration and time.

Table A-1 Height of the Tide at Any Time

h.m.	Time from the nearest high water or low water															
	h.m.	h.m.	h.m.	h.m.	h.m.	h.m.	h.m.	h.m.	h.m.	h.m.	h.m.	h.m.	h.m.	h.m.	h.m.	h.m.
4 00	0 08	0 16	0 24	0 32	0 40	0 48	0 56	1 04	1 12	1 20	1 28	1 36	1 44	1 52	2 00	2 08
4 20	0 09	0 17	0 26	0 35	0 43	0 52	1 01	1 09	1 18	1 27	1 35	1 44	1 53	2 01	2 10	2 19
4 40	0 09	0 19	0 28	0 37	0 47	0 56	1 05	1 15	1 24	1 33	1 43	1 52	2 01	2 11	2 20	2 29
5 00	0 10	0 20	0 30	0 40	0 50	1 00	1 10	1 20	1 30	1 40	1 50	2 00	2 10	2 20	2 30	2 40
5 20	0 11	0 21	0 32	0 43	0 53	1 04	1 15	1 25	1 36	1 47	1 57	2 08	2 19	2 29	2 40	2 50
5 40	0 11	0 23	0 34	0 45	0 57	1 08	1 19	1 31	1 42	1 53	2 05	2 16	2 27	2 39	2 50	3 00
6 00	0 12	0 24	0 36	0 48	1 00	1 12	1 24	1 36	1 48	2 00	2 12	2 24	2 36	2 48	3 00	3 10
6 20	0 13	0 25	0 38	0 51	1 03	1 16	1 29	1 41	1 54	2 07	2 19	2 32	2 45	2 57	3 10	3 20
6 40	0 13	0 27	0 40	0 53	1 07	1 20	1 33	1 47	2 00	2 13	2 27	2 40	2 53	3 07	3 20	3 30
7 00	0 14	0 28	0 42	0 56	1 10	1 24	1 38	1 52	2 06	2 20	2 34	2 48	3 02	3 16	3 30	3 40
7 20	0 15	0 29	0 44	0 59	1 13	1 28	1 43	1 57	2 12	2 27	2 41	2 56	3 11	3 25	3 40	3 50
7 40	0 15	0 31	0 46	1 01	1 17	1 32	1 47	2 03	2 18	2 33	2 49	3 04	3 19	3 35	3 50	4 00
8 00	0 16	0 32	0 48	1 04	1 20	1 36	1 52	2 08	2 24	2 40	2 56	3 12	3 28	3 44	4 00	4 10
8 20	0 17	0 33	0 50	1 07	1 23	1 40	1 57	2 13	2 30	2 47	3 03	3 20	3 37	3 53	4 10	4 20
8 40	0 17	0 35	0 52	1 09	1 27	1 44	2 01	2 19	2 36	2 53	3 11	3 28	3 45	4 03	4 20	4 30
9 00	0 18	0 36	0 54	1 12	1 30	1 48	2 06	2 24	2 42	3 00	3 18	3 36	3 54	4 12	4 30	4 40
9 20	0 19	0 37	0 56	1 15	1 33	1 52	2 11	2 29	2 48	3 07	3 25	3 44	4 03	4 21	4 40	4 50
9 40	0 19	0 39	0 58	1 17	1 37	1 56	2 15	2 35	2 54	3 13	3 33	3 52	4 11	4 31	4 50	5 00
10 00	0 20	0 40	1 00	1 20	1 40	2 00	2 20	2 40	3 00	3 20	3 40	4 00	4 20	4 40	5 00	5 10
10 20	0 21	0 41	1 02	1 23	1 43	2 04	2 25	2 45	3 06	3 27	3 47	4 08	4 29	4 49	5 10	5 20
10 40	0 21	0 43	1 04	1 25	1 47	2 08	2 29	2 51	3 12	3 33	3 55	4 16	4 37	4 59	5 20	5 30
Fl.	Correction to height															
	Fl.	Fl.	Fl.	Fl.	Fl.	Fl.	Fl.	Fl.	Fl.	Fl.	Fl.	Fl.	Fl.	Fl.	Fl.	Fl.
0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2
1.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4	0.4	0.5
1.5	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.6	0.7
2.0	0.0	0.0	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
2.5	0.0	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.5	0.6	0.7	0.9	1.0	1.1	1.2
3.0	0.0	0.0	0.1	0.1	0.2	0.3	0.4	0.5	0.6	0.8	0.9	1.0	1.2	1.3	1.5	1.6
3.5	0.0	0.0	0.1	0.2	0.2	0.3	0.4	0.6	0.7	0.9	1.0	1.2	1.4	1.6	1.8	2.0
4.0	0.0	0.0	0.1	0.2	0.3	0.4	0.5	0.7	0.8	1.0	1.2	1.4	1.6	1.8	2.0	2.2
4.5	0.0	0.0	0.1	0.2	0.3	0.4	0.6	0.7	0.9	1.1	1.3	1.6	1.8	2.0	2.2	2.5
5.0	0.0	0.1	0.1	0.2	0.3	0.5	0.6	0.8	1.0	1.2	1.5	1.7	2.0	2.2	2.5	2.8
5.5	0.0	0.1	0.1	0.2	0.4	0.5	0.7	0.9	1.1	1.4	1.6	1.9	2.2	2.5	2.8	3.0
6.0	0.0	0.1	0.1	0.3	0.4	0.6	0.8	1.0	1.2	1.5	1.8	2.1	2.4	2.7	3.0	3.2
6.5	0.0	0.1	0.2	0.3	0.4	0.6	0.8	1.1	1.3	1.6	1.9	2.2	2.6	2.9	3.2	3.5
7.0	0.0	0.1	0.2	0.3	0.5	0.7	0.9	1.2	1.4	1.8	2.1	2.4	2.8	3.1	3.5	3.8
7.5	0.0	0.1	0.2	0.3	0.5	0.7	1.0	1.2	1.5	1.9	2.2	2.6	3.0	3.4	3.8	4.0
8.0	0.0	0.1	0.2	0.3	0.5	0.8	1.0	1.3	1.6	2.0	2.4	2.8	3.2	3.6	4.0	4.2
8.5	0.0	0.1	0.2	0.4	0.6	0.8	1.1	1.4	1.8	2.1	2.5	2.9	3.4	3.8	4.2	4.5
9.0	0.0	0.1	0.2	0.4	0.6	0.9	1.2	1.5	1.9	2.2	2.7	3.1	3.6	4.0	4.5	4.8
9.5	0.0	0.1	0.2	0.4	0.6	0.9	1.2	1.6	2.0	2.4	2.8	3.3	3.8	4.3	4.8	5.0
10.0	0.0	0.1	0.2	0.4	0.7	1.0	1.3	1.7	2.1	2.5	3.0	3.5	4.0	4.5	5.0	5.2
10.5	0.0	0.1	0.3	0.5	0.7	1.0	1.3	1.7	2.2	2.6	3.1	3.6	4.2	4.7	5.2	5.5
11.0	0.0	0.1	0.3	0.5	0.7	1.1	1.4	1.8	2.3	2.8	3.3	3.8	4.4	4.9	5.5	5.8
11.5	0.0	0.1	0.3	0.5	0.8	1.1	1.5	1.9	2.4	2.9	3.4	4.0	4.6	5.1	5.8	6.0
12.0	0.0	0.1	0.3	0.5	0.8	1.1	1.5	2.0	2.5	3.0	3.6	4.1	4.8	5.4	6.0	6.2
12.5	0.0	0.1	0.3	0.5	0.8	1.2	1.6	2.1	2.6	3.1	3.7	4.3	5.0	5.6	6.2	6.5
13.0	0.0	0.1	0.3	0.6	0.9	1.2	1.7	2.2	2.7	3.2	3.9	4.5	5.1	5.8	6.5	6.8
13.5	0.0	0.1	0.3	0.6	0.9	1.3	1.7	2.2	2.8	3.4	4.0	4.7	5.3	6.0	6.8	7.0
14.0	0.0	0.2	0.3	0.6	0.9	1.3	1.8	2.3	2.9	3.5	4.2	4.8	5.5	6.3	7.0	7.2
14.5	0.0	0.2	0.4	0.6	1.0	1.4	1.9	2.4	3.0	3.6	4.3	5.0	5.7	6.5	7.2	7.5
15.0	0.0	0.2	0.4	0.6	1.0	1.4	1.9	2.5	3.1	3.8	4.4	5.2	5.9	6.7	7.5	7.8
15.5	0.0	0.2	0.4	0.7	1.0	1.5	2.0	2.6	3.2	3.9	4.6	5.4	6.1	6.9	7.8	8.0
16.0	0.0	0.2	0.4	0.7	1.1	1.5	2.1	2.6	3.3	4.0	4.7	5.5	6.3	7.2	8.0	8.2
16.5	0.0	0.2	0.4	0.7	1.1	1.6	2.1	2.7	3.4	4.1	4.9	5.7	6.5	7.4	8.2	8.5
17.0	0.0	0.2	0.4	0.7	1.1	1.6	2.2	2.8	3.5	4.2	5.0	5.9	6.7	7.6	8.5	8.8
17.5	0.0	0.2	0.4	0.8	1.2	1.7	2.2	2.9	3.6	4.4	5.2	6.0	6.9	7.8	8.8	9.0
18.0	0.0	0.2	0.4	0.8	1.2	1.7	2.3	3.0	3.7	4.5	5.3	6.2	7.1	8.1	9.0	9.2
18.5	0.1	0.2	0.5	0.8	1.2	1.8	2.4	3.1	3.8	4.6	5.5	6.4	7.3	8.3	9.2	9.5
19.0	0.1	0.2	0.5	0.8	1.3	1.8	2.4	3.1	3.9	4.7	5.6	6.6	7.5	8.5	9.5	9.8
19.5	0.1	0.2	0.5	0.8	1.3	1.9	2.5	3.2	4.0	4.8	5.8	6.7	7.7	8.7	9.8	10.0
20.0	0.1	0.2	0.5	0.9	1.3	1.9	2.6	3.3	4.1	5.0	5.9	6.9	7.9	9.0	10.0	10.5

Obtain from the predictions the high water and low water, one of which is before and the other after the time for which the height is required. The difference between the times of occurrence of these tides is the duration of rise or fall, and the difference between their heights is the range of tide for the above table. Find the difference between the nearest high or low water and the time for which the height is required.

Enter the table with the duration of rise or fall, printed in heavy-faced type, which most nearly agrees with the actual value, and on that horizontal line find the time from the nearest high or low water which agrees most nearly with the corresponding actual difference. The correction sought is in the column directly below, on the line with the range of tide.

When the nearest tide is high water, subtract the correction.

When the nearest tide is low water, add the correction.

APPENDIX B

EQUINOXES, SOLSTICES, AND LUNAR PHASES 1990

The dates and times for Vernal and Autumnal Equinoxes and Summer and Winter Solstices during 1990 are listed in table B-1. The 1990 dates and times for phases of the moon are given in table B-2. Times are Pacific Standard Time, add 1 hour when Daylight Savings Time is in effect; add 2 hours for times in the Barking Sands area.

Table B-1. Equinoxes and Solstices, 1990, Point Mugu Area

Vernal Equinox	20 March	1319 PST	Beginning of Spring Day and night equal length
Summer Solstice	21 June	0733 PST	Beginning of Summer Greatest duration daylight
Autumnal Equinox	22 September	2255 PST	Beginning of Autumn Day and night equal length
Winter Solstice	21 December	1907 PST	Beginning of Winter Greatest duration darkness

Table B-2. Lunar Phases, 1990, Point Mugu Area

	JANUARY		FEBRUARY		MARCH		APRIL	
	DATE	TIME	DATE	TIME	DATE	TIME	DATE	TIME
First Quarter	04	0240	02	1032	03	1805	02	0224
Full Moon	10	2057	09	1116	11	0258	09	1918
Last Quarter	18	1317	17	1048	19	0630	17	2302
New Moon	26	1120	25	0054	26	1148	24	2027
	MAY		JUNE		JULY		AUGUST	
	DATE	TIME	DATE	TIME	DATE	TIME	DATE	TIME
First Quarter	01	1218	--	----	--	----	--	----
Full Moon	09	1131	08	0301	07	1723	06	0619
Last Quarter	17	1145	15	2048	15	0304	13	0754
New Moon	24	0347	22	1055	21	1854	20	0439
First Quarter	31	0011	29	1407	29	0601	27	2334
	SEPTEMBER		OCTOBER		NOVEMBER		DECEMBER	
	DATE	TIME	DATE	TIME	DATE	TIME	DATE	TIME
Full Moon	04	1746	04	0402	02	1348	01	2350
Last Quarter	11	1253	10	1931	09	0502	08	1804
New Moon	18	1646	18	0737	17	0105	16	2022
First Quarter	26	1806	26	1226	25	0511	24	1916
Full Moon	--	---	--	----	--	----	31	1035

Because the earth's period of revolution about the sun (365.24+ days) is not evenly divisible by the moon's period of revolution about the earth (27.32+ days), the dates and times of lunar phases, moonrise and moonset, and tidal data must be recomputed for each year. The following information, however, is based on geometrical relationships and holds true for all times:

1. The New Moon rises at sunrise, crosses the meridian at noon, and sets at sunset.
2. The First Quarter Moon rises at noon, crosses the meridian at sunset, and sets at midnight.
3. The Full Moon rises at sunset, crosses the meridian at midnight, and sets at sunrise.
4. The Last Quarter Moon rises at midnight, crosses the meridian at sunrise and sets at noon.

APPENDIX C
SUNRISE AND SUNSET TABLES

Sunrise, Sunset, and Duration of Twilight for Point Mugu, CA
34°07' N, 119°07' W

Note: All times are Pacific Standard Time (120th meridian); add 1 hour when Daylight Savings Time is in effect.

Date	January		February		March		April		May		June		Date
	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	
1	0702	1658	0654	1727	0626	1753	0544	1817	0507	1840	0446	1903	1
2	0703	1659	0653	1728	0624	1753	0543	1818	0506	1841	0446	1903	2
3	0703	1700	0652	1729	0623	1754	0541	1819	0505	1842	0445	1904	3
4	0703	1700	0652	1730	0622	1755	0540	1819	0504	1843	0445	1904	4
5	0703	1701	0651	1731	0621	1756	0539	1820	0503	1843	0445	1905	5
6	0703	1702	0650	1732	0619	1757	0537	1821	0502	1844	0445	1905	6
7	0703	1703	0649	1733	0618	1758	0536	1822	0502	1845	0445	1906	7
8	0703	1704	0648	1734	0617	1758	0535	1822	0501	1846	0444	1906	8
9	0703	1705	0647	1734	0615	1759	0533	1823	0500	1846	0444	1907	9
10	0703	1705	0647	1735	0614	1800	0532	1824	0459	1847	0444	1907	10
11	0703	1706	0646	1736	0613	1801	0531	1825	0458	1848	0444	1908	11
12	0703	1707	0645	1737	0611	1802	0530	1825	0457	1849	0444	1908	12
13	0703	1708	0644	1738	0610	1802	0528	1826	0456	1849	0444	1909	13
14	0702	1709	0643	1739	0609	1803	0527	1827	0456	1850	0444	1909	14
15	0702	1710	0642	1740	0607	1804	0526	1828	0455	1851	0444	1909	15
16	0702	1711	0641	1741	0606	1805	0525	1829	0454	1852	0444	1910	16
17	0702	1712	0640	1742	0605	1806	0523	1829	0453	1852	0444	1910	17
18	0701	1713	0638	1743	0603	1806	0522	1830	0453	1853	0445	1910	18
19	0701	1714	0637	1744	0602	1807	0521	1831	0452	1854	0445	1911	19
20	0701	1715	0636	1745	0601	1808	0520	1832	0451	1855	0445	1911	20
21	0700	1716	0635	1746	0559	1809	0518	1832	0451	1855	0445	1911	21
22	0700	1717	0634	1747	0558	1809	0517	1833	0450	1856	0445	1911	22
23	0659	1718	0633	1747	0556	1810	0516	1834	0450	1857	0446	1911	23
24	0659	1719	0632	1748	0555	1811	0515	1835	0449	1857	0446	1912	24
25	0658	1720	0630	1749	0554	1812	0514	1835	0449	1858	0446	1912	25
26	0658	1721	0629	1750	0552	1813	0513	1836	0448	1859	0446	1912	26
27	0657	1722	0628	1751	0551	1813	0512	1837	0448	1900	0447	1912	27
28	0657	1723	0627	1752	0550	1814	0511	1838	0447	1900	0447	1912	28
29	0656	1724	0626	1752	0548	1815	0509	1839	0447	1901	0447	1912	29
30	0655	1725			0547	1816	0508	1839	0447	1901	0448	1912	30
31	0655	1726			0546	1816			0446	1902			31
	Average twilight Civil: 27 min. Nautical: 58 min.		Average twilight Civil: 26 min. Nautical: 55 min.		Average twilight Civil: 25 min. Nautical: 54 min.		Average twilight Civil: 26 min. Nautical: 57 min.		Average twilight Civil: 28 min. Nautical: 61 min.		Average twilight Civil: 29 min. Nautical: 65 min.		
Date	July		August		September		October		November		December		Date
	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	
1	0448	1912	0507	1858	0530	1823	0551	1741	0616	1704	0644	1647	1
2	0449	1912	0508	1857	0530	1821	0551	1740	0617	1703	0645	1647	2
3	0449	1912	0509	1856	0531	1820	0552	1738	0618	1702	0646	1647	3
4	0450	1912	0510	1855	0532	1819	0553	1737	0619	1701	0646	1647	4
5	0450	1912	0510	1854	0532	1817	0554	1736	0620	1700	0647	1647	5
6	0451	1911	0511	1853	0533	1816	0554	1734	0621	1659	0648	1647	6
7	0451	1911	0512	1852	0534	1815	0555	1733	0621	1658	0649	1647	7
8	0452	1911	0512	1851	0535	1813	0556	1732	0622	1658	0650	1647	8
9	0452	1911	0513	1850	0535	1812	0557	1730	0623	1657	0650	1647	9
10	0453	1910	0514	1849	0536	1810	0557	1729	0624	1656	0651	1647	10
11	0453	1910	0515	1848	0537	1809	0558	1728	0625	1655	0652	1647	11
12	0454	1910	0515	1847	0537	1808	0559	1726	0626	1655	0653	1648	12
13	0454	1909	0516	1846	0538	1806	0600	1725	0627	1654	0653	1648	13
14	0455	1909	0517	1845	0539	1805	0601	1724	0628	1653	0654	1648	14
15	0456	1909	0518	1844	0539	1803	0601	1723	0629	1653	0655	1648	15
16	0456	1908	0518	1843	0540	1802	0602	1721	0630	1652	0655	1649	16
17	0457	1908	0519	1841	0541	1801	0603	1720	0631	1652	0656	1649	17
18	0458	1907	0520	1840	0541	1759	0604	1719	0632	1651	0657	1650	18
19	0458	1907	0520	1839	0542	1758	0605	1718	0633	1651	0657	1650	19
20	0459	1906	0521	1838	0543	1756	0606	1717	0634	1650	0658	1650	20
21	0500	1906	0522	1837	0544	1755	0606	1715	0635	1650	0658	1651	21
22	0500	1905	0523	1835	0544	1754	0607	1714	0636	1649	0659	1651	22
23	0501	1904	0523	1834	0545	1752	0608	1713	0637	1649	0659	1652	23
24	0502	1904	0524	1833	0546	1751	0609	1712	0637	1649	0700	1653	24
25	0502	1903	0525	1832	0546	1749	0610	1711	0638	1648	0700	1653	25
26	0503	1902	0525	1830	0547	1748	0611	1710	0639	1648	0700	1654	26
27	0504	1902	0526	1829	0548	1747	0611	1709	0640	1648	0701	1654	27
28	0504	1901	0527	1828	0549	1745	0612	1708	0641	1647	0701	1655	28
29	0505	1900	0528	1827	0549	1744	0613	1707	0642	1647	0702	1656	29
30	0506	1859	0528	1825	0550	1742	0614	1706	0643	1647	0702	1656	30
31	0507	1858	0529	1824			0615	1705			0702	1657	31
	Average twilight Civil: 29 min. Nautical: 63 min.		Average twilight Civil: 26 min. Nautical: 58 min.		Average twilight Civil: 25 min. Nautical: 55 min.		Average twilight Civil: 25 min. Nautical: 54 min.		Average twilight Civil: 27 min. Nautical: 57 min.		Average twilight Civil: 28 min. Nautical: 59 min.		

Reprint for use in future years. These data valid through 2028.

**Sunrise, Sunset, and Duration of Twilight for Barking Sands, Kauai, HI
22°02' N, 159°47' W**

Note: All times are Alaska-Hawaii Standard Time (150th Meridian).

Date	January		February		March		April		May		June		Date
	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	
1	0718	1807	0718	1828	0700	1843	0632	1854	0607	1905	0555	1919	1
2	0719	1808	0717	1829	0659	1843	0631	1855	0607	1906	0555	1919	2
3	0719	1809	0717	1830	0659	1844	0630	1855	0606	1906	0555	1920	3
4	0719	1809	0716	1830	0658	1844	0629	1855	0606	1906	0555	1920	4
5	0719	18 0	0716	1831	0657	1845	0628	1856	0605	1907	0555	1920	5
6	0720	1811	0715	1831	0656	1845	0627	1856	0604	1907	0555	1921	6
7	0720	1811	0715	1832	0655	1846	0627	1856	0604	1908	0555	1921	7
8	0720	1812	0714	1833	0654	1846	0626	1857	0603	1908	0555	1921	8
9	0720	1813	0714	1833	0653	1846	0625	1857	0603	1909	0555	1922	9
10	0720	1813	0713	1834	0653	1847	0624	1857	0602	1909	0555	1922	10
11	0720	1814	0713	1834	0652	1847	0623	1858	0602	1909	0555	1922	11
12	0721	1815	0712	1835	0651	1847	0622	1858	0601	1910	0555	1923	12
13	0721	1815	0712	1835	0650	1848	0621	1858	0601	1910	0555	1923	13
14	0721	1816	0711	1836	0649	1848	0620	1859	0600	1911	0555	1923	14
15	0721	1817	0710	1836	0648	1848	0620	1859	0600	1911	0555	1924	15
16	0721	1818	0710	1837	0647	1849	0619	1859	0559	1912	0555	1924	16
17	0721	1818	0709	1837	0646	1849	0618	1900	0559	1912	0556	1924	17
18	0721	1819	0709	1838	0645	1850	0617	1900	0559	1913	0556	1925	18
19	0721	1820	0708	1838	0644	1850	0616	1900	0558	1913	0556	1925	19
20	0720	1820	0707	1839	0643	1850	0615	1901	0558	1914	0556	1925	20
21	0720	1821	0706	1839	0642	1851	0615	1901	0558	1914	0556	1925	21
22	0720	1822	0706	1840	0641	1851	0614	1902	0557	1914	0557	1925	22
23	0720	1822	0705	1840	0641	1851	0613	1902	0557	1915	0557	1926	23
24	0720	1823	0704	1841	0640	1852	0612	1902	0557	1915	0557	1926	24
25	0720	1824	0703	1841	0639	1852	0612	1903	0557	1916	0557	1926	25
26	0719	1824	0703	1842	0638	1852	0611	1903	0556	1916	0558	1926	26
27	0719	1825	0702	1842	0637	1853	0610	1904	0556	1917	0558	1926	27
28	0719	1826	0701	1843	0636	1853	0609	1904	0556	1917	0558	1926	28
29	0719	1826	0701	1843	0635	1853	0609	1904	0556	1917	0558	1926	29
30	0718	1827			0634	1854	0608	1905	0555	1918	0559	1927	30
31	0718	1828			0633	1854			0555	1918			31
	Average twilight Civil: 24 min. Nautical: 51 min.		Average twilight Civil: 23 min. Nautical: 49 min.		Average twilight Civil: 22 min. Nautical: 48 min.		Average twilight Civil: 23 min. Nautical: 50 min.		Average twilight Civil: 24 min. Nautical: 53 min.		Average twilight Civil: 25 min. Nautical: 55 min.		
Date	July		August		September		October		November		December		Date
	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	
1	0559	1927	0611	1919	0622	1856	0630	1827	0643	1802	0702	1755	1
2	0559	1927	0612	1919	0622	1855	0631	1826	0643	1802	0702	1755	2
3	0600	1927	0612	1918	0623	1854	0631	1825	0644	1801	0703	1755	3
4	0600	1927	0612	1918	0623	1853	0631	1824	0645	1801	0703	1755	4
5	0600	1927	0613	1917	0623	1852	0632	1823	0645	1800	0704	1755	5
6	0601	1927	0613	1916	0623	1851	0632	1822	0646	1800	0705	1756	6
7	0601	1927	0614	1916	0624	1850	0632	1821	0646	1759	0705	1756	7
8	0602	1927	0614	1915	0624	1849	0633	1820	0647	1759	0706	1756	8
9	0602	1926	0614	1914	0624	1848	0633	1819	0647	1758	0707	1756	9
10	0602	1926	0615	1914	0625	1847	0633	1819	0648	1758	0707	1757	10
11	0603	1926	0615	1913	0625	1846	0634	1818	0649	1758	0708	1757	11
12	0603	1926	0616	1912	0625	1845	0634	1817	0649	1757	0709	1757	12
13	0603	1926	0616	1912	0625	1844	0634	1816	0650	1757	0709	1758	13
14	0604	1926	0616	1911	0626	1843	0635	1815	0650	1757	0710	1758	14
15	0604	1926	0617	1910	0626	1842	0635	1814	0651	1756	0710	1758	15
16	0605	1925	0617	1909	0626	1841	0636	1813	0652	1756	0711	1759	16
17	0605	1925	0617	1909	0626	1840	0636	1813	0652	1756	0712	1759	17
18	0606	1925	0618	1908	0627	1839	0636	1812	0653	1756	0712	1800	18
19	0606	1925	0618	1907	0627	1838	0637	1811	0654	1755	0713	1800	19
20	0606	1924	0618	1906	0627	1837	0637	1810	0654	1755	0713	1800	20
21	0607	1924	0619	1905	0628	1836	0638	1810	0655	1755	0714	1801	21
22	0607	1924	0619	1905	0628	1836	0638	1809	0656	1755	0714	1801	22
23	0608	1923	0619	1904	0628	1835	0639	1808	0656	1755	0715	1802	23
24	0608	1923	0620	1903	0628	1834	0639	1807	0657	1755	0715	1803	24
25	0608	1922	0620	1902	0629	1833	0639	1807	0658	1755	0716	1803	25
26	0609	1922	0620	1901	0629	1832	0640	1806	0658	1755	0716	1804	26
27	0609	1922	0621	1900	0629	1831	0640	1805	0659	1755	0716	1804	27
28	0610	1921	0621	1859	0630	1830	0641	1805	0700	1755	0717	1805	28
29	0610	1921	0621	1859	0630	1829	0641	1804	0700	1755	0717	1805	29
30	0610	1920	0621	1858	0630	1828	0642	1803	0701	1755	0718	1806	30
31	0611	1920	0622	1857			0642	1803			0718	1807	31
	Average twilight Civil: 23 min. Nautical: 54 min.		Average twilight Civil: 23 min. Nautical: 50 min.		Average twilight Civil: 22 min. Nautical: 48 min.		Average twilight Civil: 23 min. Nautical: 49 min.		Average twilight Civil: 24 min. Nautical: 51 min.		Average twilight Civil: 24 min. Nautical: 52 min.		

Tables for use in future years. These data valid through 2026.

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Biology Department
4667 Telegraph Road
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Camarillo, CA 93010-8712

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Code 6243 (Qualls)	3
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Code 6280 (Haynes)	5
OIC, San Nicolas Island	
Code 6400 (LCDR Buskey)	10
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